

2.10 MEXICAN GRAY WOLF (*Canis lupus baileyi*) (Endangered)

2.10a. Action Area

The action area includes all areas potentially affected, directly or indirectly, by all aspects of the project. Potential habitat for Mexican gray wolf is found within portions of Santa Cruz County containing oak and pine/juniper savannas above 4,000 ft (1,200 m). Wolves may travel long distances during hunting expeditions, typically in an irregular circle 20 mi (34 km) to 60 mi (68 km) in diameter. The action area for the Mexican gray wolf considered for the proposed action includes all potential habitat and travel corridors in western Santa Cruz and southern Pima County.

2.10b. Natural History and Distribution

Mexican gray wolves (Figure 21) are the smallest and southernmost of the 5 subspecies of gray wolf in North America. The Mexican gray wolf is a large dog-like carnivore with a mixed brown, rust, black, gray, and white. This species has a distinct white lip line, chin, and throat. Adults weigh between 50-90 lbs (23-41 kg) (Hoffmeister 1986). The historic range was from southeastern Arizona, southwestern New Mexico, southwestern



Texas, and south through the Sierra Madre of Mexico. The Mexican gray wolf is the southernmost occurring and most endangered subspecies in North America. This wolf is the last subspecies of gray wolf known to occur in the Arizona-New Mexico area. The last known naturally occurring specimen in the United States was found in New Mexico in 1970 (USFWS 2001d).

Figure 21. Mexican gray wolf.

Historically, Mexican gray wolf habitat was montane woodlands, presumably because of the favorable combination of cover, water, and prey availability. Most wolf collections came from pine, oak, and pinyon-juniper woodlands, and intervening or adjacent grasslands above 1,372 m (4,500 ft) (Brown 1983b). Wolves avoided desertscrub and semidesert grasslands, but wooded riparian corridors were probably used for travelling and hunting (Parsons 1996).

These are social animals in the dog family that live and travel in packs of 7 to 30 animals depending upon prey size and availability. Mexican gray wolves prey upon a variety of animals from mice and squirrels to deer and elk. Territory size can range from 30 (78 km²) to 500 mi² (1,295 km²) or more. Packs are led by a pair of dominant animals that control most of the breeding. Breeding season lasts from late winter to early spring, and the dominant female produces up to 6 pups for the pack. The wolves care for the pups communally.

During the late 1800s through the mid 1900s, extensive hunting, trapping, and poisoning efforts at local, state, and federal levels resulted in the extirpation of this species from the United States portion of its range. Reintroduction efforts of captive bred wolves are under way in the Blue Range Recovery Area of eastern Arizona and New Mexico. Fourteen packs have been released to date.

2.10c Critical Habitat

No critical habitat has been designated for this species.

2.10d Current Status Statewide

Mexican gray wolves were listed as endangered by the USFWS in 1976 (41 FR 17736) without critical habitat. In 1998, an experimental, non-essential population was designated for the southwest (63 FR 1763) and a reintroduction program was initiated. Eleven wolves from captive breed stock were reintroduced into the Apache National Forest in southeastern Arizona under the experimental, non-essential designation in an effort to re-establish the subspecies to a portion of its historic range. A Recovery Plan for this subspecies was completed in 1982 and revisions are currently in progress (USFWS 2001d).

Mexican gray wolf populations steadily declined in Arizona because of predator control programs and conflicts with livestock interests. Pressure to control wolves became a priority beginning in the 1920s when this subspecies was nearly eliminated from the state and prevention of wolves from entering from Mexico was undertaken. In 1921 and 1922, a reported 58 wolves were taken by trapping or poisoning in Arizona. By 1924, reported takings dropped to 29 and by 1936, to 5. After 1952, only 2 wolves were reported taken in Arizona, 1 in 1958 and another in 1960 (Hoffmeister 1986). Reports of Mexican gray wolves living in the wild in Arizona continued into the early 1970s (USFWS 1982).

Similar predator control programs in Mexico reduced populations and may have eliminated the wolf by the 1980s. Surveys conducted in Mexico in the early 1990s did not confirm Mexican gray wolf populations in the wild (Parsons 1996).

2.10e Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, its habitat, and ecosystem within the action area. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consideration.

The Tumacacori EMA contains some areas of montane and riparian woodlands that may serve as dispersal corridors for Mexican gray wolves. If wolf populations exist in the mountains of Sonora, these corridors may be used as hunting and dispersal corridors. There are currently no plans to reintroduce the Mexican gray wolf into southern Arizona and, because of the distance and fragmentation of intervening habitat, it is unlikely that current experimental populations in northern Arizona could disperse into Santa Cruz County.

2.10f Effects of Proposed Action on the Mexican Gray Wolf

Direct Effects

Construction Noise and Activity

Because the only wild populations of Mexican gray wolves in Arizona occur in the Apache National Forest, disturbance from construction of the proposed action, even in suitable dispersal habitat, is highly unlikely. In the event that populations of wolves exist in Mexico and could disperse into southern Arizona, the greatest likelihood of disturbance will result from the use of helicopters during early morning or late evening hours. However, because of the linear nature of the proposed action, any noise or construction disturbance will be widely distributed and relatively minor in any single area.

Indirect Effects

Habitat Modification and Fragmentation

Roads can reduce habitat value because of habitat fragmentation and edge effects. Gray wolves (*Canis lupus*) in Wisconsin are limited to places with pack-area mean road densities of 0.7 mi/1 mi² (1.1 km/1 km²) or less (Mladenoff et al. 1995). Some studies have shown that a few large areas of low road density, even in a landscape of high average road density, may be the best indicator of suitable habitat for large vertebrates (Rudis 1995). Access and construction roads for the proposed action commonly are spurs from existing roads and range between 500 ft (152 m) and 1,000 ft (305 m) in length, which do not isolate or separate habitat patches. Furthermore, construction activities within montane woodlands, riparian corridors or major canyons will be minimal and widely distributed, resulting in negligible impacts to the composition or structure of Mexican gray wolf habitat.

Increased Legal and Unauthorized Access to Mexican Gray Wolf Habitat

Gray wolves experience negative interactions with humans and roads are a key facilitator (Thiel 1985). Increased human access to potential wolf habitat through the use of temporary proposed construction roads could reduce the quality of the habitat and human interactions may increase mortality (Mech 1973). The road closure techniques outlined in the SECTION 1.4 and the RA (URS 2003) will minimize unintended uses of these roads.

Accidental Wildfire

Increased road access may contribute to an increase in the frequency of human-caused ignitions in some areas (Gucinski et al. 2001). Because of their mobility, wolves will not likely be directly impacted by wildfires; however, these wildfires could potentially alter or destroy portions of prey species habitat. While the short-term effects of wildfires may affect prey species through loss of forage from the fire, increased herbaceous production in the years following a fire may improve habitat in the long term.

New roads also may act as firebreaks and improve response time of firefighters to wildfires, thereby preventing these fires from gaining in size and intensity. A study in southern California concluded that the road network had been a key factor in determining suppression strategies were used, both in firefighter access and because roads were

widely used for backfiring and burning-out operations (Salazar and Gonzalez-Caban 1987). Early studies of fuelbreak effectiveness in southern California came to similar conclusions (Green 1977). If deemed appropriate, new roads may allow fuelwood collection in areas currently not accessible, thereby reducing the density of downed, woody material, which is capable of carrying wildfires across the landscape. Fire prevention measures outlined in the Fire Prevention Plan will minimize the risks of wildfires associated with the proposed action.

Invasive Species

Roads may be the first point of entry for invasive species into a new landscape, and can serve as a corridor along which plants move farther into the landscape (Lonsdale and Lane 1994, Greenberg et al. 1997). Some invasive plants may then be able to move into adjacent patches of suitable habitat. Invasion by these plants may have significant biological and ecological effects if the species are able to disrupt the structure or function of an ecosystem. Roads constructed for the proposed action could allow the establishment or increased density of non-native plants, such as Lehmann's lovegrass, an invasive species that facilitates wildfires (McPherson 1995). Measures outlined in the Invasive Species Management Plan will minimize the introduction or spread of invasive species as a result of the proposed action.

2.10g Cumulative Effects

Cumulative effects include the effects of future state, local, or private actions that are reasonably certain to occur in the action area considered in this BA. While the action area for this species encompasses private, state, and federal lands, the habitat with the highest potential for occupancy by Mexican gray wolf occurs on USFS land in Santa Cruz County. Future federal actions will be subject to Section 7 consultation and will not be considered cumulative.

Although the amount of future private development within Santa Cruz County is unknown, many rural areas of Arizona are experiencing substantial growth. Between 1990 and 2000, Santa Cruz County grew 29.3 percent (U.S. Census Bureau 2000). Despite its distance from the proposed action, an increase in population in Nogales, Arizona and other regional population centers translates into an increased demand for recreational use of USFS land.

An undetermined level of border crossings by UDI also occurs within the action area and results in habitat damage from new roads, discarded trash, illegal campfires, and disturbance near water sources. These border crossings are likely to continue or increase.

2.10h Effects Determination and Incidental Take

Construction noise and activity associated with the proposed action may affect the Mexican gray wolf, but it is not likely to adversely affect the species because any disturbance will be widely distributed and short term in duration.

Because the proposed action is not likely to adversely affect the Mexican gray wolf, no take is anticipated.

3.0 USFS SENSITIVE SPECIES

USFS special status species are plant and wildlife species that are of concern because their populations are declining in size. In a letter dated 25 April 2002, AGFD listed 40 USFS Sensitive species that are known to occur in the vicinity of the proposed corridor or may be expected to occur along the corridor if suitable habitat exists. The information listed in the letter was based on AGFD Heritage Data Management System. AGFD species abstracts and other literature also were reviewed for species' historical ranges and habitat preferences. While field reconnaissance surveys were conducted along the entire corridor, species-specific surveys were impractical because of ongoing drought conditions in the project area, therefore the potential presence of sensitive species was assumed in all areas containing potential habitat. The 40 USFS Sensitive species that may occur on or near the proposed Western Corridor are listed in Table 4.

TABLE 4. SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.

COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Alamos Deer Vetch <i>Lotus alamosanus</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arid Throne Fleabane <i>Erigeron arisolis</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arizona Giant Sedge <i>Carex ultra</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Arizona Metalmark <i>Calephelis rawsoni arizonensis</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Mitigation plantings of host species will reduce impacts.
American Peregrine Falcon <i>Falco peregrinus anatum</i>	No Impacts	<ul style="list-style-type: none"> Seasonal restriction will prevent disturbance to species within project area.
Bartram's Stonecrop <i>Graptopetalum bartramii</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Beardless Chinch Weed <i>Pectis imberbis</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona. Species is adapted to disturbances.

TABLE 4 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.

COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Catalina Beardtongue <i>Penstemon discolor</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Cave Myotis <i>Myotis velifer</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Chiltepine <i>Capsicum annuum</i> var. <i>glabriusculum</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Chihuahuan Sedge <i>Carex chihuahuensis</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Chiricahua Mountain Brookweed <i>Samolus vagans</i>	No Impacts.	<ul style="list-style-type: none"> No construction in perennial aquatic habitats.
Five-Stripped Sparrow <i>Aimophila quinquestriata</i>	No Impacts.	<ul style="list-style-type: none"> Potential habitat and know occurrences are outside project area.
Foetid Passionflower <i>Passiflora foetida</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area.
Gentry Indigo Bush <i>Dalea tentaculoides</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population may be impacted. Other viable populations occur outside of project area.
Giant Spotted Whiptail <i>Cnemidophorus burti</i> <i>strictogrammus</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area.

TABLE 4 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Large-Flowered Blue Star <i>Amsonia grandiflora</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Lowland Leopard Frog <i>Rana yavapaiensis</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area. No construction in perennial aquatic habitats.
Lumholtz Nightshade <i>Solanum lumholtzianum</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Mexican Garter Snake <i>Thamnophis eques megalops</i>	No Impacts.	<ul style="list-style-type: none"> No construction in perennial aquatic habitats. Minimal impacts to riparian habitat.
Mock-Pennyroyal <i>Hedeoma dentatum</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Nodding Blue-eyed Grass <i>Sisyrinchium cernuum</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area.
Northern Gray Hawk <i>Asturina nitida maxima</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Mitigation of riparian vegetation. Populations within Arizona appear stable.
Santa Cruz Beehive Cactus <i>Coryphantha recurvata</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Santa Cruz Star Leaf <i>Choisya mollis</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Santa Cruz Striped Agave <i>Agave parviflora</i> ssp. <i>parviflora</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Plants occur throughout Nogales Ranger District. Mitigation plantings of agave will reduce impacts.

TABLE 4 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Seeman Groundsel <i>Senecio carlomasonii</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Sonoran Noseburn <i>Tragia laciniata</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Southern Pocket Gopher <i>Thomomys umbrinus intermedius</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Superb Beardtongue <i>Penstemon superbus</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Supine Bean <i>Macroptilium supinum</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Pre-construction surveys will be conducted and, if necessary, mitigation measures will be coordinated with USFS personnel.
Sweet Acacia <i>Acacia smallii</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Thurber Hoary Pea <i>Tephrosia thurberi</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Thurber's Morning-glory <i>Ipomoea thurberi</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Virlet Paspalum <i>Paspalum virletti</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area.

TABLE 4 (CONTINUED). SUMMARY OF EFFECTS ON U. S. FOREST SERVICE SENSITIVE SPECIES.		
COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Weeping Muhly <i>Muhlenbergia xerophila</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Western Barking Frog <i>Eleutherodactylus augusti cactorum</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area.
Western Yellow-billed Cuckoo <i>Coccyzus americanus</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Wiggins Milkweed Vine <i>Metastelma mexicanum</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Populations within Arizona appear stable. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Wooly Fleabane <i>Laennecia eriophylla</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

3.1 PLANTS

Alamos deer vetch (*Lotus alamosanus*)

Alamos deer vetch is a perennial herb found in southern Arizona, and Sonora, Chihuahua, and Durango, Mexico. Within Arizona, this plant is found in Sycamore Canyon and the Pajarito Mountains of Santa Cruz County, and near Garden Valley in Maricopa County. This plant is considered a wetland obligate species that is restricted to stream banks in canyons at elevations ranging from 3,500 ft (1,067 m) to 5,500 ft (1,676 m) (AGFD 1999a). Within the Nogales RD, this plant occurs in the Sycamore Canyon and Peña Blanca Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

Population trends for Alamos deer vetch are unknown (AGFD 1999a). The proposed transmission line may cross potential Alamos deer vetch habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Furthermore, viable populations occur outside of the project area, including the Gooding RNA. There may be an impact to individual plants during development of the line; however, disturbance will be limited to a few individuals and is not likely to result in a trend toward federal listing or loss of viability.

Arid throne fleabane (*Erigeron arisolis*)

Arid throne fleabane is an annual to short-lived perennial forb that occurs in Arizona, southwestern New Mexico and Sonora, Mexico. Within Arizona, this plant is found in Apache, Cochise, Pima, and Santa Cruz counties. This species is typically found on moist rocky soils in grasslands, grassy openings within oak woodlands, and roadsides at elevations between 4,200 ft (1,280 m) and 5,500 ft (1,676 m) (AGFD 2000a). On the CNF Nogales RD, it has been documented from Box Canyon and Ruby Roads (T. Newman, CNF, pers. comm., 20 August 2002).

Arid throne fleabane favors moist areas in grasslands and grassy openings in oak woodlands, areas also favored by livestock for grazing (AGFD 2000a). The proposed transmission line parallels Ruby Road, a known location for this species. Placement of the transmission line may impact individual arid throne fleabane, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Arizona giant sedge (*Carex ultra*)

Arizona giant sedge is the largest sedge found in Arizona. Its range includes southeast Arizona, extreme southwest New Mexico (Hidalgo County, Indian Springs in the Pelocillos) and Mexico (Sonora and Coahila). Within Arizona, this sedge is found in Cochise, Graham, Pinal, Yavapai, Pima (Santa Rita Mountains and the Rincon Valley), and Santa Cruz counties (Santa Rita and Atascosa mountains). Typically only 1 patch per mountain has been found. Like other sedges, this plant is associated with moist soil

near perennial wet springs and streams and undulating rocky-gravelly terrain at elevations ranging from 2,040 ft (622 m) to 6,000 ft (1,829 m) (AGFD 2000b). Within the Nogales RD, Arizona giant sedge is found in Sycamore Canyon and Mule Ridge in the Atascosa Mountains, and at Deering Spring and Big Casa Blanca Canyon in the Santa Rita Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

Small populations of this sedge are vulnerable to local disturbance of aquatic or riparian habitat (AGFD 2000b). The proposed transmission line may cross potential Arizona giant sedge habitat; however, no construction will occur in perennial aquatic habitats and construction within riparian habitats will be minimized to the greatest extent possible. There may be an impact to individual plants during development of the line; however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Bartram's stonecrop (*Graptopetalum bartramii*)

Bartram's stonecrop is a small succulent perennial found in southern Arizona and Chihuahua, Mexico (one record). In Arizona, this plant occurs in Santa Cruz County within the Patagonia, Santa Rita, and Tumacacori Mountains, in Pima County within the Baboquivari, Dragoon, and Rincon mountains, and in Cochise County within the Chiricahua Mountains. Habitat for Bartram's stonecrop consists of cracks in rocky outcrops within shrub live oak-grassland communities located on the sides of rugged canyons. This plant is usually found in heavy litter cover and shade where moisture drips from rocks at elevations ranging from 3,900 ft (1,189 m) to 6,700 ft (2,042 m) (AGFD 1997a). Bartram's stonecrop plants are found on the west side of the Nogales RD in Tres Amigos Gulch; Sycamore, Peña Blanca, Alamo, and Peñasco canyons; in the vicinity of Montana Peak and Peña Blanca Lake (T. Newman, CNF, pers. comm., 20 August 2002).

Bartram's stonecrop populations are typically small and isolated. Illegal collection of the plant is the main management issue at this time. Other factors that may affect populations include mining and mineral exploration, habitat alteration due to livestock grazing, trampling by cattle and recreationists, and road construction and maintenance. The proposed transmission line crosses over known Bartram's stonecrop populations within the Nogales RD. Placement of the transmission line may impact individual Bartram's stonecrop, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to Bartram's stonecrop are not likely to result in a trend toward federal listing or loss of viability.

Beardless chinch weed (*Pectis imberbis*)

Beardless chinch weed is a perennial herb that is found in southern Arizona, western Chihuahua and eastern Sonora, Mexico. Within Arizona, this plant can be found in Cochise, Pima, and Santa Cruz counties (within Santa Cruz County it is found along Ruby Road in the Atascosa Mountains and in the Red Rock area of Canelo Hills). Habitat for this species consists of open areas in grassland and oak-grassland

communities. Beardless chinch weed has an extremely broad habitat range and can be found at elevations from 4,000 ft (1,219 m) to 5,000 ft (1,524 m) (AGFD 1998a).

Populations of beardless chinch weed may be susceptible to impacts from grazing and road maintenance activities but the species is adapted to disturbances and grows along road cuts (AGFD 1998a). The proposed transmission line crosses over known beardless chinch weed populations within the Nogales RD. Placement of the transmission line may impact individual beardless chinch weed, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to beardless chinch weed are not likely to result in a trend toward federal listing or loss of viability.

Catalina beardtongue (*Penstemon discolor*)

Catalina beardtongue is a perennial herbaceous sub-shrub found in southern Arizona. This shrub is found in Cochise, Graham, Pinal, Pima (within the Santa Catalina Mountains), and Santa Cruz counties (within the Atascosa and Tumacacori mountains). Habitat for Catalina beardtongue consists of bare rock outcrops, barren soil outcrops, and bedrock openings in chaparral or pine-oak woodlands at elevations ranging from 4,120 ft (1,256 m) to 7,600 ft (2,316) (AGFD 1999b). On the Nogales RD, this shrub occurs in the upper end of Peck Canyon, Corral Nuevo, and the adjacent Bartalo Mountain (Cedar Canyon), typically on whitish volcanic ash (T. Newman, CNF, pers. comm., 20 August 2002).

Rock climbers threaten some populations of this plant but few other threats exist (AGFD 1999b). The proposed transmission line crosses over known Catalina beardtongue populations within the Nogales RD. Placement of the transmission line may impact individual Catalina beardtongue, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to Catalina beardtongue are not likely to result in a trend toward federal listing or loss of viability.

Chiltepine (*Capsicum annuum* var. *glabriusculum*)

Chiltepine is an herbaceous to woody perennial shrub that is found in south Texas, southern New Mexico, southern Arizona, and south to tropical America. Within Arizona, a few populations of this plant are found in the Chiricahua, Tumacacori, Baboquivari, and Ajo Mountains. This plant occurs in protected, frost-free canyons in oak woodlands of slopes at less than 4,500 ft (1,372 m) elevation (typically found at elevations ranging from 3,600 ft [1,097 m] to 4,400 ft [1,341 m]). Chiltepine plants grow under nurse shrubs and usually are associated with rock ledges and outcrops. Within the Nogales RD, there are populations in the Tumacacori Mountains and Cobre Ridge area, and there are suspected populations on the west side of the RD (AGFD 1991a; T. Newman, CNF, pers. comm., 20 August 2002).

This plant is declining in some areas because of drought, overgrazing, and local over-collection of berries (AGFD 1991a). Placement of the transmission line may impact individual chiltepine plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to chiltepine are not likely to result in a trend toward federal listing or loss of viability.

Chihuahuan sedge (*Carex chihuahuensis*)

Chihuahuan sedge is a grass-like perennial plant that occurs in southeastern Arizona, New Mexico (Hidalgo County), and Mexico (Sonora and Chihuahua). Within Arizona, this plant ranges from Cochise, Graham, Gila, Pima (Santa Catalina, San Luis, and Rincon mountains), and Santa Cruz counties (Atascosa and Santa Rita mountains, and the Santa Cruz River). Chihuahuan sedge can be found in wet soils along streambeds and in shallower draws of pine-oak forests and riparian woodlands. It also is found in wet meadows, cienegas, marshy areas, and canyon bottoms from 1,100 ft (335 m) to 8,000 ft (AGFD 1999c). Within the Nogales RD, this plant has been found near Arivaca Lake (on private land), Sycamore Canyon, and south of Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement on the population status of Chihuahuan sedge (AGFD 1999c). The proposed transmission line may cross potential Chihuahuan sedge habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. There may be an impact to individual plants during development of the line; however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Chiricahua Mountain brookweed (*Samolus vagans*)

Chiricahua Mountain brookweed is a perennial herb found in southeastern Arizona, western Chihuahua, and eastern Sonora, Mexico. This plant apparently reaches its southern limit in southern Sonora, Mexico. Within Arizona, this species is found in the Huachuca Mountains of Cochise County, the Rincon, Santa Catalina, and Santa Rita mountains of Pima County, and the Canelo Hills and Pajarito mountains of Santa Cruz County. The Chiricahua Mountain brookweed is confined to areas with permanent water, such as springs, seeps, and in and along streams at elevations ranging from 1,219 to 2,195 m (4,000 – 7,200 ft) (AGFD 1999d). Within the Nogales RD, this plant occurs in Florida Canyon of the Santa Rita Mountains and in Sycamore Canyon of the Atascosa Mountains (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Chiricahua Mountain brookweed (AGFD 1999d). Because no construction will occur within perennial aquatic habitats, the proposed action will have no effect on the population status of the Chiricahua Mountain brookweed.

Foetid passionflower (*Passiflora foetida*)

The foetid passionflower is a herbaceous vine found in southeastern Texas and the Rio Grande Valley, southern Arizona, and southward throughout Mexico, Central and South America, and the West Indies. Within Arizona, this species is found in the Baboquivari Mountains, Arivaca, and Las Guijas Mountains of Pima County and in California Gulch and the Bartlett Mountains of Santa Cruz County. In Arizona, this plant occurs on hillsides and canyons of the Lower Sonoran zone from 1,067 to 1,707 m (3,500 – 5,600 ft) in elevation (AGFD 2000c). Within the Nogales RD, foetid passionflowers have been recorded in the California Gulch and Holden Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of foetid passionflower (AGFD 2000c). Because the known populations of this plant occur outside of the proposed TEP transmission line corridor, there will be no effect on the population status of the foetid passionflower.

Gentry indigo bush (*Dalea tentaculoides*)

The Gentry indigo bush is an herbaceous perennial shrub found primarily in southern Arizona, but its range may extend into Mexico. Within Arizona, this shrub was historically found in the Sycamore Canyon drainage of the Atascosa Mountains, in the Pajarito Mountains of Santa Cruz County, and within the Baboquivari Mountains (1930s record) and Mendoza Canyon (1965 record) of Pima County. A population currently exists in the Gooding Natural Area approximately 1 mile from the proposed action. Gentry indigo bush is typically found along canyon bottoms on cobble terraces subject to occasional flooding and seems to prefer disturbance-prone environments at elevations ranging from 1,097 to 1,341 m (3,600 – 4,400 ft) (AGFD 1998b). Historic collection records indicate that this plant may grow on rocky hillsides. Within the Nogales RD, this plant has been recorded in Sycamore Canyon, in the vicinity of Peñasco Canyon, Kaiser Canyon, and north of Manzanita Mountain (T. Newman, CNF, pers. comm., 20 August 2002).

Potential threats to Gentry indigo bush populations are cattle grazing (Gori et al. 1991), recreational foot traffic, and flooding events that eliminate terraces occupied by this species (AGFD 1998b). No direct impacts from the proposed TEP transmission line on Gentry indigo bush are anticipated. Indirect effects from increased erosion, increased risk of wildfire, or the introduction of nonnative species may impact individual plants, however, because of the distance of the project and the conservation measures (invasive species control, fire prevention plan, erosion control), only a small percentage of the population within the project area may be subject to potential impacts. Furthermore, populations of this species occur well outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Large-flowered blue star (*Amsonia grandiflora*)

The large-flowered blue star is an herbaceous perennial that is found in northern Sonora and Durango, Mexico, and southern Arizona. Within Arizona, this plant is found in the Patagonia, Atascosa/Pajarito mountains of Santa Cruz and Pima counties. Habitat for this

species consists of canyon bottoms in oak woodlands typically dominated by Emory oak and Mexican blue oak; however, site-specific qualities are inconsistent. Large-flowered blue star plants have adapted to rock fall disturbance and are typically found at elevations ranging from 1,189 to 1,372 m (3,900–4,500 ft) (AGFD 1998c). Within the west side of the Nogales RD, this plant occurs at Peña Blanca and Arivaca Lakes, Sycamore Canyon, Chiminea Canyon, California Gulch, and near Ruby (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of large-flowered blue star are rare, with only 15 to 20 populations within 2 mountain ranges as the total world distribution, but populations seem to be stable. This plant is highly susceptible to disturbance, and expanding development in the Nogales area (AGFD 1998c) may impact populations. The proposed TEP transmission line crosses near a known large-flowered blue star population in Peña Blanca Canyon, and some individual plants, comprising a small percentage of the total population, may be impacted. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Lumholtz nightshade (*Solanum lumholtzianum*)

The Lumholtz nightshade is an herbaceous annual that is found in southern Arizona and northern Mexico. Within Arizona, this plant is found in the Arivaca and San Luis Mountains of Pima County and the Patagonia, Atascosa, and Santa Rita Mountains of Santa Cruz County. Lumholtz nightshade plants are typically found in washes and low ground near wet depressions and along stream banks from 914 to 1,402 m (3,000–4,600 ft) elevation in desert grassland plant communities. This plant is also often found in disturbed, weedy areas (AGFD 2000d). Within the Nogales RD, this nightshade is found in the vicinity of Arivaca, Ruby, California Gulch, Nogales, Cobre Ridge, and Oro Blanco Wash (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Lumholtz nightshade (AGFD 2000d). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mock-pennyroyal (*Hedeoma dentatum*)

The mock-pennyroyal is an herbaceous perennial plant found in southeastern Arizona and northern Sonora, Mexico. Within Arizona, this plant is found in the Chiricahua, Huachuca, Mule, Whetstone, and Winchester mountains of Cochise County, the Pinaleno Mountains of Graham County, the Baboquivari, Rincon, and Santa Cruz mountains of Pima County, and the Atascosa, Mustang, Pajarito, and Santa Rita mountains of Santa Cruz County. Habitat for this plant consists of oak woodland, oak-pine forest, and pine forest. It can be found on open roadcuts, steep rocky outcrops, and gravelly slopes in

wooded canyons with open to full sunlight at elevations ranging from 1,173 to 2,500 m (3,850 – 8,200 ft) (AGFD 2000e).

Populations of mock-pennyroyal seem to be restricted to a relatively small geographic area, and populations are apparently small. Because habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Nodding blue-eyed grass (*Sisyrinchium cernuum*)

Nodding blue-eyed grass is a perennial forb with grass-like leaves that occurs in southeastern Arizona, west Texas, and Mexico. Within Pima and Santa Cruz counties, Arizona it occurs in the Pajarito, Santa Rita, Atascosa, and Rincon mountains as well as Sycamore Canyon. This species can be found in desert grassland and pine-oak woodlands from 1,006 to 2,438 m (3,300 – 8,000 ft) in elevation along streams in partial shade and in canyon bottoms. It grows in wet soil by seeps, pools, or springs in desert scrub. It has also been found on sandy stream banks. On the Nogales RD, this plant has been found at 1,189 m (3,900 ft) in Sycamore Canyon on the west side and at 1,402 m (4,600 ft) in Big Casa Blanca Canyon in the Santa Rita Mountains (AGFD 1999e). The known location of this plant in Sycamore Canyon is within the Goodding RNA, located approximately 1.6 km (1 mi) west of the proposed ROW (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of nodding blue-eyed grass (AGFD 1999e). However, this species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD. The proposed transmission line will not cross over or near known locations of this plant within the Goodding RNA. Therefore, placement of the TEP transmission line from Sahuarita to Nogales will have no impact on the nodding blue-eyed grass.

Santa Cruz beehive cactus (*Coryphantha recurvata*)

The Santa Cruz beehive cactus is a succulent perennial that occurs in southern Arizona and northern Sonora (about 20 km [12.4 mi] south of the international border), Mexico. Within Arizona, this species occurs in western Santa Cruz County from Nogales and the Tumacacori Mountains west to the Atascosa/Pajarito mountains. Santa Cruz beehive cacti are found in alluvial soils of valleys and foothills in grassland and oak woodland habitats from 1,219 to 1,829 m (4,000 – 6,000 ft). These plants are either on rocky hillsides with high grass cover or in rock crevices where runoff accumulates and provides a more favorable moisture relationship than the surrounding soils (AGFD 1998d). Within the Nogales RD known plant locations have increased since 1997 (813 plant clumps in 1997, 807 plant clumps in 1998, and 175 in 1999) (T. Newman, CNF, pers. comm., 20 August 2002).

Accessible populations of the Santa Cruz beehive cactus have declined due to collection, but the status of populations beyond accessible areas is unknown (AGFD 1998d). The proposed TEP transmission line crosses over several known Santa Cruz beehive cactus populations within the Nogales RD. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Santa Cruz star leaf (*Choisya mollis*)

The Santa Cruz star leaf is a perennial shrub that occurs in southern Arizona within the Atascosa, Pajarito, and Tumacacori mountains of Santa Cruz County. Santa Cruz star leaf plants are found primarily within madrean evergreen woodland communities from 1,067 to 1,524 m (3,500 – 5,000 ft) in elevation. This plant is usually found in canyon bottoms and slopes, usually in the shade of oaks and other trees, or rock outcrops (AGFD 1999f). Santa Cruz star leaf plants have been found throughout the eastern portion of the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Santa Cruz star leaf are typically found in rugged and remote mountainous areas where human activity is low and the likelihood of disturbance or removal of plants is minimal. However, the species population trend is unknown and existing populations are relatively rare, have a restricted range, and are only found within specific habitats (AGFD 1999f). The proposed TEP transmission line will cross areas with known populations of Santa Cruz star leaf. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Santa Cruz striped agave (*Agave parviflora* ssp. *parviflora*)

Santa Cruz striped agave is a small perennial succulent found in southern Arizona and northern Mexico. Within Arizona, this species is found near Arivaca in Pima County, and in the Las Guijas, Pajarito, Patagonia, Santa Rita, and Atascosa mountains of Santa Cruz County. Habitat for this agave consists of rocky or gravelly slopes of middle elevation mountains, in desert grassland or oak woodlands. This plant appears to prefer soils on rounded ridge-tops where grasses and shrubs are sparse and soil is bare or nearly so (AGFD 1998e). Santa Cruz striped agave have been found throughout the Nogales RD (primarily within the Atascosa, Pajarito, San Luis, and Las Guijas mountains), and in recent years the documented number of individual plants and number of locations has increased for this area (T. Newman, CNF, pers. comm., 20 August 2002).

Some populations of Santa Cruz striped agave have declined due to illegal collection and loss of habitat due to mining and road construction. Livestock grazing has caused degradation of habitat and browsing of flower stalks (AGFD 1998e). The proposed TEP transmission line crosses areas with known populations of Santa Cruz striped agave and there may be an impact to individual plants during development of the line. Placement of

the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area and transplanting of agave plants in project area will minimize impacts. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Seeman groundsel (*Senecio carlomasonii*)

The seeman groundsel is a perennial herb or subshrub found in southern Arizona and Mexico (Sonora, Chihuahua, Nayarit). Within Arizona, this plant is found in the Chiricahua and Huachuca mountains of Cochise County, the Baboquivari and Santa Rita mountains of Pima County, and the Santa Rita, Pajarito, and Peña Blanca mountains of Santa Cruz County (AGFD 2000f). Within the Nogales RD, seeman groundsel have been recorded in the Peña Blanca Lake and Sycamore Canyon areas (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of seeman groundsel (AGFD 2000f). A potential threat to seeman groundsel habitat may be trampling by hikers. Placement of the proposed transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Sonoran noseburn (*Tragia laciniata*)

Sonoran noseburn is an herbaceous perennial that occurs in southern Arizona, Mexico (Sonora and Chihuahua), and possibly New Mexico. Within Arizona this plant can be found in Cochise County in the Huachuca Mountains and Canelo Hills, in Pima County in the Santa Rita Mountains, and in Santa Cruz County in the Atascosa Mountains (Sycamore Canyon), Patagonia Mountains, Pajarito Mountains, Canelo Hills (O'Donnell Canyon), and Santa Rita Mountains. Sonoran noseburn typically occur at elevations of 1,067 to 1,722 m (3,500 – 5,650 ft) along streams and canyon bottoms, on shaded hillsides within the upper parts of the Lower Sonoran and Upper Sonoran biotic communities, and open woodland areas (AGFD 2000g). This species has been found in canyons, along streams, and near roadways of the Nogales RD (AGFD 2000g).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Sonoran noseburn (AGFD 2000g). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Superb beardtongue (*Penstemon superbus*)

The superb beardtongue is a perennial herbaceous forb found in southeastern Arizona, New Mexico, and Mexico (Chihuahua). Within southern Arizona, this species is found in Pima County in the Santa Catalina and Santa Rita mountains, and in Santa Cruz County within the Tumacacori Mountains. This plant is generally found in rocky canyons, dry hillsides, and along washes in sandy or gravelly soils at elevations between 945 and 1,676 m (3,100 – 5,500 ft) (AGFD 2000h). Within the Nogales RD, it has been found in Rock Corral Canyon and Box Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of superb beardtongue (AGFD 2000h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Supine bean (*Macropitium supinum*)

The supine bean is a perennial herb that grows in colonies and produces underground fruits. The total range for this species includes Santa Cruz County, Arizona, south into Mexico, including the states of Sonoran and Nayarit. Within Arizona, this plant can be found in the Atascosa/Pajarito, San Luis, and Patagonia Mountains, and the southern portion of the Santa Cruz River drainage in Santa Cruz County (much of this area is within the Nogales RD). Supine bean are typically found along ridge tops and gentle slopes of rolling hills in semi-desert grassland or grassy openings in oak-juniper woodlands at elevations between 1,097 and 1,494 m (3,600 – 4,900 ft) (AGFD 1999g).

There are currently an estimated 12 populations of this species in Arizona. Populations range from small (around 20 individuals) to relatively large (around 3,500 individuals). A 43% decline in a monitored population was recorded from 1989 to 1993. This decline was apparently due to low reproductive output and poor recruitment, although the reasons for these are unknown (AGFD 1999g). Possible threats to this species include degradation of habitat due to livestock grazing, off-road vehicle activity, recreation (camping and hiking), Border Patrol activities, utility corridor and road construction/maintenance, and home building (AGFD 1999g).

Because of the recent decline in monitored populations and drought conditions noted in 2002, additional surveys will be conducted prior to construction in potential supine bean habitat. If populations of this species are found in the vicinity of construction, consultation with USFS biologists will be initiated to minimize impacts. Development of the proposed TEP transmission line is likely to have an impact on this species. However, once additional surveys are completed, impacts are likely to be limited to individual plants and not whole populations. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Sweet acacia (*Acacia smallii*)

The sweet acacia is a woody perennial spiny shrub or small tree found in Texas, Arizona, and California south to Argentina. Within Arizona, this species is found in the Baboquivari Mountains of Pima County and Sycamore Canyon and Atascosa Mountains of Santa Cruz County. Sweet acacia are typically found in the lower slopes of canyons of riparian areas in desert grassland communities from elevations ranging from 1,067 to 1,219 m (3,500 – 4,000 ft) (AGFD 1992).

Population trends for the sweet acacia are unknown (AGFD 1992). The proposed TEP transmission line may cross potential sweet acacia habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Thurber hoary pea (*Tephrosia thurberi*)

The Thurber hoary pea is a perennial shrub that occurs in southern Arizona and Mexico (northern Sonora and southwestern Chihuahua). Within Arizona, this plant can be found in Cochise, Santa Cruz, and Pima counties. On the Nogales RD, Thurber hoary pea plants are found in the Santa Rita and Atascosa mountains. This species typically occurs on rocky slopes among oaks, pines, junipers, manzanitas, open hilltops, and grasslands at elevations between 1,067 and 2,134 m (3,500 – 7,000 ft) (AGFD 1999h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber hoary pea (AGFD 1999h). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Thurber's morning-glory (*Ipomoea thurberi*)

Thurber's morning-glory are perennial herbaceous vines that are found in southern Arizona and Mexico (Chihuahua and Sonora). Within Arizona, this plant is found in the Huachuca and Mule Mountains of Cochise County, the Santa Rita Mountains of Pima County, and in the vicinity of Nogales, the Canelo Hills, and the Patagonia and Atascosa/Pajarito mountains of Santa Cruz County. Habitat in Arizona typically consists of rocky hillsides and canyon slopes in madrean evergreen woodland and semi-desert grassland communities in elevations between 1,158 and 1,570 m (3,800 – 5,150 ft) (AGFD 2000i). On the Nogales RD, this morning glory has been found in the vicinity of Peña Blanca Lake, east of Peñasco Canyon, and Bear Valley (T. Newman, CNF, pers. comm., 20 August 2002).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of Thurber's morning-glory (AGFD 2000i). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Virlet paspalum (*Paspalum virletti*)

The virlet paspalum is a perennial grass found in southeastern Arizona and Mexico (Sonora and San Luis Potosi). Within Arizona, this grass is found in the Huachuca Mountains of Cochise County, and in the Pajarito Mountains and Sycamore Canyon of Santa Cruz County. This grass is found in sandy soils of canyon bottoms in semi-desert grassland communities and grassy areas within madrean evergreen woodland communities at elevations ranging from 1,067 to 1,737 m (3,500 – 5,700 ft) (AGFD 1999i). In the Nogales RD, the only known location for this grass is in Sycamore Canyon growing in a sandy canyon bottom (T. Newman, CNF, pers. comm., 20 August 2002).

This species is rare in Arizona, where it is known from only 2 widely separated populations. There is no information on the potential effects of land use activities, such as utility placement, on the population status of virlet paspalum (AGFD 1999i). Known locations of this plant occur outside of the proposed TEP transmission line corridor; therefore, placement of the line is not likely to impact the virlet paspalum.

Weeping muhly (Sycamore Canyon muhly) (*Muhlenbergia xerophila*)

Weeping muhly is a perennial herbaceous grass found only in southern Arizona. Populations occur in the Santa Catalina, Rincon, Santa Rita, Tumacacori, and Baboquivari mountains of Pima County, and in Sycamore Canyon within the Pajarito Mountains of Santa Cruz County. Weeping muhly most often grow in crevices of cliffs, bedrock, and other rocks along canyon bottoms. This grass is also known from rocky canyon slopes in oak, pine-oak, and riparian woodlands at elevations between 1,073 and 1,829 m (3,520 – 6,000 ft) (AGFD 1999j).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of weeping muhly (AGFD 1999j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Wiggins milkweed vine (*Metastelma mexicanum*)

Wiggins milkweed vine is a perennial herbaceous vine with a woody base found in southeastern Arizona to southern Sonora, Mexico. Within Arizona, this vine occurs around the Nogales and Ruby areas, Sycamore Canyon area, and Patagonia Mountains of Santa Cruz County, and Baboquivari, Coyote, and Catalina mountains of Pima County.

This vine is typically found on open slopes within open oak woodland on granite soils of juniper flats at elevations between 1,067 and 1,554 m (3,500 – 5,100 ft) (AGFD 2000j). Wiggins milkweed vine has been found in several locations within the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of Wiggins milkweed vine within Arizona appear to be stable. This vine depends on surrounding vegetation for microhabitat and will be affected by any disturbance to area habitat (AGFD 2000j). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Woolly fleabane (*Laennecia eriophylla*)

Woolly fleabane is a perennial herb found in southeastern Arizona and northern Mexico (Sonora and Chihuahua). In Arizona, woolly fleabane occurs in the Atascosa Mountains, Pajarito Mountains, Santa Rita Mountains, Canelo Hills, and in the vicinity of Sonoita Creek in Santa Cruz County. This species is typically found in gravelly soil of rocky slopes and ridges with dense grass cover in semi-desert grassland, dry oak woodland, and pine-oak woodland communities at elevations between 1,292 and 1,722 m (4,240 – 5,650 ft) (AGFD 1999k). There are known locations of woolly fleabane in the Nogales RD (T. Newman, CNF, pers. comm., 20 August 2002).

Population sizes of this plant are usually very small, with typically no more than 40 plants found in any of the populations known from Arizona. Population numbers fluctuate with the amount and timing of summer rains from year to year. This species was probably more common before its habitat was altered by excessive grazing (AGFD 1999k). Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

3.2 INVERTEBRATES

Arizona metalmark (*Calephelis rawsoni arizonensis*)

The Arizona metalmark is a small, brown butterfly with bands of blue metallic markings on the upper and underside of the body. This butterfly occurs in Arizona, and from the Animas Mountains in southwestern New Mexico southward to Sonora, Mexico. The southern limits of its range are poorly defined to date. In Arizona, this species is known from as far north as Gila County then southward through Graham, Cochise, Pima, and Santa Cruz counties in most of the mountains therein. Arizona metalmark butterflies occur mostly above the desert floor in mountain foothills. Within these mountains, it is found in riparian canyons in oak woodland or more arid regions at elevations from 716 to 1,676 m (2,350 – 5,500 ft). Canyons with standing water for a major portion of the year

appear to contain populations of this species as long as *Agave* spp. are present for larvae development (AGFD 2001a). There is no information on the potential effects of land use activities, such as utility placement, on the population status of Arizona metalmark (AGFD 2001a).

Placement of the transmission line may indirectly impact individuals of this species through habitat modification, however because the species is widely distributed across southern Arizona, only a small percentage of Arizona metalmarks may be impacted. Furthermore, transplanting of agave plants also will minimize impacts. Impacts are not likely to result in a trend toward federal listing or loss of viability.

3.3 BIRDS

American peregrine falcon (*Falco peregrinus anatum*)

The American peregrine falcon subspecies is a medium-sized raptor that nests from central Alaska south to Baja California, Sonora, and the highlands of Central Mexico. Within Arizona, this raptor breeds wherever sufficient prey is available near cliffs. These raptors are rare or absent as breeders in the southwestern quarter of Arizona. Optimum habitat for peregrine falcons consists of steep, sheer cliffs overlooking woodlands, riparian areas, or other habitats supporting avian prey species in abundance. These raptors may also be found in less optimal habitat consisting of small broken cliffs in ponderosa pine forests or large sheer cliffs in very xeric areas. The presence of an open expanse is critical. American peregrine falcons can be found at elevations ranging from 122 to 2,743 m (400 – 9,000 ft) (Glinski 1998, AGFD 1998f). Peregrine falcon nests were found on Ramanote Peak and along Sycamore Canyon (CNF 2000). Both these nests are at least 1.6 km (1 mi) from the proposed ROW. In 2002, another nest was found on Castle Rock, which is within the MSO PAC and within 0.3 km (0.18 mi) of proposed structures. The seasonal restrictions in effect for MSO (SECTION 1.4) will prevent breeding season disturbance of peregrines on Castle Rock.

American peregrine falcons have been found in great numbers in Arizona as well as in areas that will have formerly been considered marginal habitat. This trend suggests that populations in Arizona may have reached levels saturating the optimal habitat available (AGFD 1998f). Placement of the proposed transmission line is not likely to disturb known nesting peregrine falcons. If new nest sites are encountered during construction, conservation measures will be developed in coordination with CNF biologists to prevent adverse effects. Development of the TEP line is not likely to result in a trend toward federal listing or loss of viability of this species.

Five-striped sparrow (*Aimophila quinquestriata*)

The five-striped sparrow is found in western portions of northern Sinaloa and Sonora, Mexico and the southeastern most portions of Arizona. This sparrow is primarily found in Mexico, but its range reaches into southeastern Arizona. Here, it is rarely found during breeding season, and there are only a few winter records. Five-striped sparrow habitat is highly specialized, consisting of tall, dense shrubs on rocky, semi-desert hillsides and canyon slopes (New Mexico Game and Fish Department and the Fish and Wildlife

Information Exchange 2000). Within the Nogales RD, this sparrow has been recorded within Sycamore Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Populations of five-striped sparrow have declined because of habitat loss, fragmentation, and degradation (New Mexico Game and Fish Department and the Fish and Wildlife Information Exchange 2000). The proposed TEP transmission line will not cross Sycamore Canyon where these sparrows have been observed. This species is not likely to be affected by the proposed placement of a transmission line within the Nogales RD.

Northern gray hawk (*Asturina nitida maxima*)

The gray hawk is a medium-sized raptor with a gray back, black tail with 2 or 3 white bands, and a finely barred gray and white chest, abdomen, and thighs (Glinski 1998). The gray hawk prefers Sonoran riparian deciduous forest and woodland plant communities and can be found along the Santa Cruz and San Pedro rivers, Sonoita Creek, and Sopori Wash. This species also has been reported from the Hassayampa and Salt rivers. This hawk species is migratory and usually arrives in Arizona in mid-March and returns south during winter months (AGFD 2000k). Gray hawks prefer cottonwood, mesquite, and hackberry woodlands with a prey base of lizards, especially the whiptail lizard (*Cnemidophorus* spp.).

The current population trend for gray hawks is considered stable by the AGFD (2000k). Potential nesting habitat exists along small portions of the proposed TEP transmission line corridor along Sopori Wash. Individual gray hawks may be indirectly impacted by habitat modification from construction activity related to transmission line placement; however, construction within riparian habitats will be minimized to the greatest extent possible. Furthermore, riparian plants within Sopori Wash will be mitigated to facilitate habitat recovery. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)

The western yellow-billed cuckoo is a long and slender bird with short, dark legs that nests from southern California through the northeastern United States, south through the United States to the Florida Keys, Central America and southern Baja California, Mexico. This species winters from South America to central Argentina and Uruguay. Within Arizona, western yellow-billed cuckoo are found in southern and central Arizona and the extreme northeast portion of the state. This species is typically found in streamside areas with cottonwood, willow groves, and larger mesquite bosques (AGFD 1998g). This species has been observed in Sopori Wash and Sycamore, Peck, and Peña Blanca canyons (AGFD 1998g; CNF 2000; P. Titus, T. Furgason, SWCA, pers. comm. 16 October 2002).

Populations of western yellow-billed cuckoo have been reduced; a general decline is occurring in all areas with known populations (AGFD 1998g). This species is sensitive to habitat fragmentation and degradation of riparian woodlands due to agricultural and residential development (Hughes 1999). The proposed transmission line may cross

potential cuckoo habitat; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

3.4 REPTILES AND AMPHIBIANS

Giant spotted whiptail (*Cnemidophorus burti strictogrammus*)

The giant spotted whiptail is a long, slender lizard found in southeastern Arizona, extreme southwest New Mexico, and northern Sonora, Mexico. Within southeastern Arizona, this lizard is found in Cochise County; the Santa Catalina, Santa Rita, Baboquivari, and Pajarito mountains and in the vicinity of Oracle in Pima County; and in Pinal County. Giant spotted whiptail lizards inhabit mountain canyons, arroyos, and mesas in arid and semi-arid regions, entering lowland deserts along stream courses. They are found in dense shrubby vegetation, often among rocks near permanent and intermittent streams at elevations ranging from near sea level to 1,372 m (4,500 ft). Open areas of bunch grass within these riparian habitats are also occupied (AGFD 2001b).

Giant spotted whiptail populations are thought to be stable and some populations are locally abundant even though this species is limited in distribution (AGFD 2001b). Because the known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the giant spotted whiptail.

Lowland leopard frog (*Rana yavapaiensis*)

The lowland leopard frog is found in low elevations in the drainage of the lower Colorado River and its tributaries in Nevada, California, Arizona, New Mexico, northern Sonora and extreme northeast Baja California, Mexico (probably extirpated from California and Nevada). Within Arizona, this frog has been found in the Virginia River drainage in the extreme northwestern part of the state, in the Colorado River near Yuma, and west, central, and southeast Arizona south of the Mogollon Rim. This frog frequents desert, grassland, oak, and oak-pine woodland in permanent pools of foothill streams, rivers, and permanent stock tanks. They typically stay close to water at elevations ranging from 244 to 1,676 m (800 – 5,500 ft) (AGFD 1997b). Within the Nogales RD, this frog has been recorded in Pesquiera and Alamo canyons, California Gulch, Adobe, Temporal Gulch, Big Casa Blanca, Box Canyon, and Gardner Canyon (T. Newman, CNF, pers. comm., 20 August 2002).

Lowland leopard frog populations are considered stable in central Arizona but declining in southeast Arizona, and populations have been extirpated from southwestern Arizona. Potential threats to this species are manipulation to major watercourses, water pollution, introduced species (fish, bullfrogs, and crayfish), heavy grazing, and habitat fragmentation (AGFD 1997b). Because no construction will occur within perennial aquatic habitats and known populations occur outside project area, the proposed

transmission line will have no significant effect on the population status of the lowland leopard frog.

Mexican garter snake (*Thamnophis eques megalops*)

The Mexican garter snake ranges from southeastern Arizona and extreme southwestern New Mexico, southward into the highlands of western and southern Mexico, to Oaxaca. Within Arizona, this snake occurs in the southeast corner of the state from the Santa Cruz Valley east and generally south of the Gila River. Valid records (post 1980) have recorded this snake in the San Rafael and Sonoita grasslands area and from Arivaca. Mexican garter snakes are most abundant in densely vegetated desert grassland habitat surrounding cienegas, cienega-streams, stock tanks, and in or near water along streams in valley floors and generally open areas, but not in steep mountain canyon stream habitat. This snake is generally found at elevations ranging from 914 to 1,524 m (3,000 – 5,000 ft) but may reach elevations of 2,591 m (8,500 ft) (AGFD 2001c).

Populations of Mexican garter snakes are decreasing, with extirpations at several localities since 1950 as habitat has changed and introduced predators have invaded. Management concerns for this species include predation by introduced bullfrogs and predatory fishes, urbanization and lowered water tables, and habitat destruction, including that due to overgrazing (AGFD 2001c). Because no construction will occur within perennial aquatic habitats and construction within riparian habitats will be minimized, the proposed transmission line will have no significant effect on the population status of the Mexican garter snake.

Western barking frog (*Eleutherodactylus augusti cactorum*)

The western barking frog is a secretive terrestrial frog found in extreme southern Arizona, southeast New Mexico, and central Texas south to the Isthmus of Tehuantepec. In Arizona, this frog historically occurred in Pima and Santa Cruz counties within the Santa Rita and Pajarito mountains. Habitat consists of rocky hillsides of canyons in woodland vegetation at elevations between 1,158 and 2,134 m (3,800 – 7,000 ft). Permanent water is not a necessary component of western barking frog habitat. There are very few records of this species in Arizona, and none have been recorded within the Nogales RD (AGFD 1995b).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of western barking frogs (AGFD 1995b). Because known populations occur outside the project area, the proposed transmission line will have no significant effect on the population status of the western barking frog and is not likely to result in a trend toward listing or loss of viability.

3.5 MAMMALS

Cave myotis (*Myotis velifer*)

The cave myotis is a large bat found in the southwestern half of Arizona and the immediate adjacent parts of California, Nevada, New Mexico, and the northern third of Sonora, Mexico. Within Arizona, this bat is found south of the Mogollon Plateau from

Lake Mohave, Burro Creek, Montezuma Well, San Carlos Apache Reservation, and the Chiricahua Mountains south to Mexico. Cave myotis have not been recorded in the extreme southwestern part of the state and are found in small numbers in southeastern Arizona in the winter. This bat typically prefers desertscrub habitats of creosote, brittlebush, paloverde, and cacti but they sometimes can be found up in pine-oak communities. Cave myotis roost in caves, tunnels, mineshafts, under bridges, and sometimes buildings within a few kilometers of a water source (AGFD 1997c).

Cave myotis colonies are vulnerable at the roost sites, especially maternity roosts, because they congregate in large numbers (AGFD 1997c). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the cave myotis.

Southern pocket gopher (*Thomomys umbrinus intermedius*)

The southern pocket gopher is a small gopher found in extreme southeastern Arizona and southwestern New Mexico, south into Mexico. Within Arizona, this gopher is found primarily in the southern most portion of the state in the oak belt of the Santa Rita, Patagonia, Atascosa, Pajarito, and Huachuca mountains. Southern pocket gophers have been found at Peña Blanca Spring in gravelly soil along a broad wash. Elsewhere, this species is generally found on rocky slopes within open oak woodlands in the lower parts of mountain ranges from 1,372 to 2,743 m (4,500 – 9,000 ft) in elevation. There has been only 1 record for the southern pocket gopher within the Nogales RD, specifically at Peña Blanca Canyon in the Atascosa/Pajarito mountains. However, it is suspected that this species has a much wider range (AGFD 1998h).

There is no information on the potential effects of land use activities, such as utility placement, on the population status of southern pocket gopher (AGFD 1998h). Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.0 BLM SENSITIVE SPECIES

Criteria for BLM Sensitive species include those that are:

1. Under status review by the USFWS, or
2. Whose numbers are declining so rapidly that Federal listing may become necessary, or
3. With typically small and widely dispersed populations,
4. Those inhabiting ecological refugia or other specialized or unique habitats.

The potential impacts to BLM Sensitive species were determined based on the habitat conditions within the BLM lands crossed by the proposed action, the life history of the species, and the proposed construction methods. Only those species that have a potential of occurring on or near the BLM parcel were evaluated. The 13 BLM Sensitive species evaluated were identified in the BLM Sensitive species list for Arizona (Instruction Memorandum No. AZ-2000-018) dated 21 April 2000 and are listed in Table 5.

TABLE 5. SUMMARY OF EFFECTS ON BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.		
COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Balloonvine <i>Cardiospermum corindum</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
False grama <i>Cathastecum erectum brevifolium</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Tumamoc globeberry <i>Tumamoca macdougallii</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Loggerhead shrike <i>Lanius ludovicianus</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southern Arizona.
Rufous-winged sparrow <i>Aimophila carpalis</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

TABLE 5 (CONTINUED). SUMMARY OF EFFECTS ON BUREAU OF LAND MANAGEMENT SENSITIVE SPECIES.		
COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Western burrowing owl <i>Athene curvicularia hypugea</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total population within project area may be impacted. Populations of this species occur throughout southwestern U.S.
Texas horned lizard <i>Phrynosoma cornutum</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area.
Big free-tailed bat <i>Nyctinomops macrotis</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
California leaf-nosed bat <i>Macrotus californicus</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Fringed myotis <i>Myotis thysandodes</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Pocketed free-tailed bat <i>Nyctinomops femorosaccus</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Spotted bat <i>Euderma maculatum</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.
Underwood's mastiff bat <i>Eumops underwoodi</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> No known roosts within project area. Only small percentage of foraging habitat within project area may be impacted. Populations of this species occur throughout southern Arizona.

4.1 PLANTS

Balloonvine (*Cardiospermum corindum*)

This perennial vine is widely distributed in tropical and subtropical regions and is known from the Coyote Mountains in Pima County (Kearny and Peebles 1960). Because potential habitat for this species is widespread, placement of the transmission line may impact individual plants. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

False grama (*Cathestecum erectum (brevifolium)*)

False grama is a perennial, drought-tolerant grass found on dry hills and plains of Southern Arizona and Northern Mexico. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Tumamoc globeberry (*Tumamoca macdougallii*)

This perennial vine occurs in shade of nurse plants along sandy washes below ~914 m (3,000 ft) in elevation. The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual plants, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

4.2 BIRDS

Loggerhead shrike (*Lanius ludovicianus*)

The loggerhead shrike occurs in open country with scattered trees and shrubs, savanna, desertscrub and occasionally open woodland (AGFD 2002). In Arizona, this species usually summers throughout open parts of the state below the Transition Zone and is also periodically found along the Mexican border west of Baboquivari Mountains (Phillips et al. 1983). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Rufous-winged sparrow (*Aimophila carpalis*)

The rufous-winged sparrow is classified as a migratory bird and is a resident of eastern Pima County, including Avra Valley, and was once thought to be extirpated in Arizona due to overgrazing but was rediscovered in the Tucson Area in 1936. Rufous-winged sparrows generally use habitats characterized by scattered low shrubs and trees, which provide cover and foraging areas during mid-summer days. Many of these areas contain significant grassland components. Threats to the species include urban development, overgrazing, and exotic species, all of which result in losses of grassland communities utilized by this species (Pima County 2001). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Western burrowing owl (*Athene cunicularia hypugea*)

The Western burrowing owl inhabits heavily grazed tracts of mixed-grass prairie, particularly where there are burrows created by large rodents, such as prairie dogs and Richardson ground squirrels. Distribution extends from southern Canada through the western United States to South America. Arizona is 1 of 3 states that provide important wintering areas for this species (USGS 2003). Because habitat for this species is widely distributed, placement of the transmission line may impact this species. However because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur throughout the southwestern United States. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

4.3 REPTILES AND AMPHIBIANS**Texas horned lizard (*Phrynosoma cornutum*)**

The Texas horned lizard occurs from Kansas to extreme southeastern Arizona and lives mainly in sandy areas of deserts, grasslands, prairies, and scrublands (Bartlett and Bartlett 1999) where it often inhabits abandoned animal burrows (Bockstanz 1998). Because known populations occur outside of the project area, the proposed transmission line will have no significant effect on the population status of this species.

4.4 MAMMALS**Big free-tailed bat (*Nyctinomops macrotis*)**

Distribution of the big free-tailed bat occurs from the southwestern United States southward through the Caribbean, Central America, and into the northern part of South America. Northern populations are known to migrate to southern Arizona and Mexico in the fall, yet this species is widely scattered throughout Arizona during the spring and summer too. In Arizona, this bat has been found in pinyon-juniper, Douglas-fir, and Sonoran desertscrub habitats, but it is believed that these locations are foraging sites. Preferred roosting sites include rock crevices and fissures of mountain cliffs in rugged,

rocky areas of desertscrub habitat (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the big free-tailed bat.

California leaf-nosed bat (*Macrotus californicus*)

Distribution of the California leaf-nosed bat in the United States spans southern California, southern Nevada, and southwestern Arizona and extends southward into Mexico, to the southern tip of Baja California, northern Sinaloa, and southwestern Chihuahua. This bat lives predominantly in Sonoran and Mohave desertscrub habitats, but is occasionally found in the Chihuahuan and Great Basin deserts. Daytime roosting sites are usually mines and caves, and nighttime roosts include open buildings, cellars, bridges, porches, and mines. These bats do not hibernate or migrate; therefore, they tend to live in the same area year after year and remain active year-round (AGFD 1993, 2001d; Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the California leaf-nosed bat.

Fringed myotis (*Myotis thysandodes*)

Distribution of the fringed myotis ranges from southern British Columbia, Canada southward throughout the western United States, and down to southern Mexico. It occurs in a variety of habitats – from desertscrub to oak and pinyon woodlands to spruce-fir forests. Roosting sites include caves, mines, and buildings. These bats tend to roost in tight clusters and may change locations periodically in response to thermoregulatory needs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the fringed myotis.

Pocketed free-tailed bat (*Nyctinomops femorosaccus*)

The pocketed free-tailed bat ranges from the southwestern United States (including southern California, Arizona, and New Mexico, and the Trans-Pecos region of Texas), south into Mexico through Baja, Sonora, Durango, and Jalisco to, at least, Michoacan. This bat can be found in the arid lowlands of the desert Southwest, where it roosts in crevices and caves of rugged cliffs, slopes, and rock outcrops (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites. Potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed and will not likely result in a trend toward federal listing or loss of viability of this species.

Spotted bat (*Euderma maculatum*)

Distribution of the spotted bat ranges throughout centralwestern North America, from southcentral British Columbia down to southern Mexico. In Arizona, its habitat ranges from low desert areas in the Southwest to high desert and riparian habitats in the northwestern part of the state. This bat has also been documented in conifer forests in northern Arizona. Roosting sites are often situated in rock crevices on high cliffs (AGFD 1993, Harvey et al. 1999). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of the spotted bat.

Underwood's mastiff bat (*Eumops underwoodi*)

The range of Underwood's mastiff bat is limited, from south-central Arizona, into the arid lowlands of Sonoran and western Mexico, and into Honduras. It is believed to be a year-round resident of Arizona, ranging from the Baboquíviri Mountains down to Organpipe National Monument. This bat prefers Sonoran desertscrub and mesquite/grassland plant communities. Roosting tends to occur in crevices along steep cliffs and sometimes in the cracks of buildings (AGFD 1993). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during development of the transmission line; however, these disturbances will be isolated and widely distributed. Furthermore, populations of this species occur throughout southern Arizona. Therefore, impacts will not likely result in a trend toward federal listing or loss of viability of this species.

5.0 AGFD WILDLIFE OF SPECIAL CONCERN

AGFD was consulted in regards to state listed special status species and habitats that may be affected by the proposed action. Several state listed special status species and overall wildlife habitat may be affected by the proposed action. The AGFD mission is to conserve, enhance, and restore Arizona's diverse wildlife resources and habitats through aggressive protection and management programs. Continued consultation and input from AGFD will ensure that impacts of the proposed action are minimized and mitigation efforts are successful.

Listed in Table 6 are state special status species that may be found in the vicinity of the proposed action, based on AGFD's Heritage Data Management System (HDMS) (1 July 2002). Effects of the proposed action on the majority of these species will be avoided or minimized through mitigation efforts stipulated for federally listed species. However, additional mitigation is recommend for the Sonoran Desert tortoise as 5 individuals were located near the Tinaja Hills area during field surveys of the proposed ROW (HEG 2002, unpublished data).

TABLE 6. SUMMARY OF EFFECTS ON WILDLIFE OF SPECIAL CONCERN IN ARIZONA.		
COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Black-bellied whistling duck <i>Dendrocyna autumnalis</i>	No Impacts.	<ul style="list-style-type: none"> No construction in perennial aquatic habitats.
Crested caracara <i>Caracara cheriway</i>	No Impacts.	<ul style="list-style-type: none"> Known populations occur outside project area.
Desert tortoise - Sonoran population <i>Gopherus agassizii</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total potential habitat within project area may be impacted. Pre-construction surveys will minimize impacts to species.
Elegant trogon <i>Trogon elegans</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Populations of this species occur in isolated mountain ranges throughout southern Arizona.
Great Plains narrow-mouthed toad <i>Gastrophryne olivacea</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.
Mexican long-tongued bat <i>Choeronycteris mexicana</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Only small percentage of total potential habitat within project area may be impacted. Mitigation plantings of agaves will reduce impacts.

TABLE 6 (CONTINUED). SUMMARY OF EFFECTS ON WILDLIFE OF SPECIAL CONCERN IN ARIZONA.		
COMMON NAME <i>Scientific Name</i>	EFFECTS DETERMINATION	JUSTIFICATION
Mexican vine snake <i>Oxibelis aeneus</i>	No Impacts.	<ul style="list-style-type: none"> Known occurrences are outside project area.
Osprey <i>Pandion haliaetus</i>	No Impacts	<ul style="list-style-type: none"> No construction in perennial aquatic habitats.
Rose-throated becard <i>Pachyramphus aglaiae</i>	No Impacts.	<ul style="list-style-type: none"> Known occurrences are outside project area.
Tarahumara frog <i>Rana tarahumarae</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability	<ul style="list-style-type: none"> Currently does not exist in project area but may be reintroduced into Sycamore Canyon. Conservation measures for federally listed species in Sycamore Canyon will prevent significant impacts.
Thick-billed kingbird <i>Tyrannus crassirostris</i>	No Impacts	<ul style="list-style-type: none"> No potential habitat within project area.
Tropical Kingbird <i>Tyrannus melancholicus</i>	May impact individuals of this species, but is not likely to result in a trend toward federal listing or loss of viability.	<ul style="list-style-type: none"> Minimal impacts to riparian habitat. Only small percentage of total population within project area may be impacted. Other viable populations occur outside of project area.

Black-bellied whistling duck (*Dendrocyna autumnalis*)

The black-bellied whistling duck is "goose-like" with a long neck and long pink legs. This species has a cinnamon or chestnut breast and back with a black belly and bright coral-red bill. The total range for this species is from the Gulf coast and lower Rio Grande Valley of Texas and central Arizona south through Mexico, Central America to southern Brazil. In Arizona, the range for the black-bellied whistling duck is southeastern and central Arizona. Black-bellied whistling ducks are commonly seen in the Santa Cruz Valley, particularly in ponds near and around Nogales. The habitat for this species consists of the banks of rivers, lakes, ponds, riparian areas, and stock tanks (Brown 1985).

Because of habitat loss and apparent population declines from historic levels, the black-bellied whistling duck has been placed on the AGFD Threatened Native Wildlife of Arizona List as a candidate species. This species appears to be increasing in Arizona in urban settings at man-made ponds and at sewage treatment plants. It also appears to be stable at some private ranch ponds, which tend to be isolated from hunting pressure (Corman 1994).

Because no construction will occur in perennial aquatic habitats, the proposed transmission line will have no effect on the population status of the black-bellied whistling duck.

Crested caracara (*Caracara cheriway*)

The crested caracara is a medium sized raptor with bold black and white plumage and a bright yellow-orange face and legs. The crested caracara ranges from southern Arizona and northern Mexico to Tierra del Fuego. In the United States, it occurs only along the southern border in Texas and Arizona, and in Florida, where there is an isolated population in the south-central peninsula. In Arizona, their range extends up from San Miguel in the Baboquivari Valley north to Quijotoa, Sells, and Coyote Pass. This raptor occurs regularly on the Tohono O'odham Indian Reservation. Small groups of crested caracara are seen in Sasabe and south of the Mexican border near Sonoyta, Sonora. This raptor is found in open habitats, typically grassland, prairie, pastures, or desert with scattered taller trees, shrubs, or cacti. The crested caracara is found in areas characterized by low-profile ground vegetation and scattered tall vegetation. Specifically in Arizona, vegetation consists of saguaro, mesquite, paloverde, cholla and acacia (Morrison 1996).

Arizona populations of crested caracara on the Tohono O'odham Reservation are likely stable because few threats exist. Reports of individual, and in some cases groups, of this raptor outside of the reservation indicate that its range within Arizona is probably as extensive as it was historically. No apparent threat currently exists to Arizona populations; however, the AGFD has listed the crested caracara as a threatened native wildlife. This species is considered vulnerable if habitat conditions worsen (Morrison 1996).

Habitat surveys did not detect the presence of any bird of prey nests along the corridor. Furthermore, no known populations of this species occur within the project area. Therefore, the proposed action will have no effect on the population status of the crested caracara.

Desert tortoise (Sonoran) (*Gopherus agassizii*)

The Sonoran Desert tortoise ranges from northern Sinaloa, Mexico to southern Nevada and southwestern Utah, and from southcentral California east to southeastern Arizona. The desert tortoise is divided into 2 populations for purposes of the Endangered Species Act. The threatened Mojave population occurs north and west of the Colorado River and the unlisted Sonoran population occurs south and east of the Colorado River. Within Arizona, the Sonoran Desert tortoise is found south and east of the Colorado River from Mojave County to the south, beyond the International Boundary and many scattered locations in between. The Sonoran population of the desert tortoise occurs primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub at elevations ranging from 152 to 1,615 m (500 – 5,300 ft). Burrows and shelter sites are generally below rocks and boulders, in rock crevices, under vegetation, and also in caliche caves of incised wash banks (AGFD 2001e).

Several threats to tortoise populations in the Sonoran Desert have been identified, including habitat fragmentation, habitat loss and degradation from urban and agricultural development and roads, wildfires associated with invasion of non-native grasses and forbs, illegal collection, and genetic contamination of wild populations by escaped or

released captives. Although current evidence suggests that Arizona populations are stable there are substantial gaps in available data (Arizona Interagency Desert Tortoise Team 1996).

During ground surveys of the proposed transmission line corridor, 5 desert tortoise were found (HEG, unpublished data). Per recommendations of Spencer and Humphrey (1999) for any ground disturbing projects, surveys should be conducted a minimum of 48 hours prior to grading and again just prior (as it is occurring) to vegetation clearing (Desert Tortoise Council 1999). While the proposed action may have a minimal effect on the potential habitat of this species, pre-construction surveys will minimize impacts to individual tortoise and is therefore not likely to result in a trend toward listing or loss of viability.

Elegant trogon (*Trogon elegans*)

The elegant trogon is a medium sized bird with a round head, large eyes, a white band on an iridescent green breast, black face and throat, red belly and undertail coverts. The total range for this bird is from southern Arizona and New Mexico south through Mexico to southern Nicaragua to northwestern Costa Rica. In Arizona, the elegant trogon is found in sky island mountains, most commonly the Atascosa, Chiricahua, Huachuca, and Santa Rita mountains. Elegant trogons are found in riparian areas consisting of sycamore, cottonwood, and oak, and also in coniferous woodlands at elevations ranging from 1,036 to 2,073 m (3,400 – 6,800 ft) (AGFD 2001f).

Population trends for the elegant trogon are not well known. No evidence indicates population declines in any of the core canyons occupied over the past few decades. Threats to this species include degradation and loss of native riparian habitat through stream diversion, groundwater withdrawal, erosion, and overgrazing (AGFD 2001f).

The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual trogons, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur in isolated mountain ranges throughout southern Arizona. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Great Plains narrow-mouthed toad (*Gastrophryne olivacea*)

The Great Plains narrow-mouthed toad is a small, stout toad with stubby limbs, a small pointed head with a fold of skin on the back of the head. The total range for this species is from southeastern Nebraska and Missouri south through Texas to western Mexico. Within Arizona, the Great Plains narrow-mouthed toad is found in the vicinity of Santa Cruz County, Pima County, to near Casa Grande, Arizona in Pinal County. Habitat for this species in Arizona consists of mesquite semi-desert grassland communities to oak woodland communities near riparian areas at elevations ranging from sea level to around 1,250 m (4,100 ft) (AGFD 1995c).

Population trends for the Great Plains narrow-mouthed toad are currently unknown. Populations in Arizona are at the extreme northwestern edge of the species range and distribution is limited throughout its range (AGFD 1995c). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individuals of this species, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside the project area. Therefore, impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican long-tongued bat (*Choeronycteris mexicana*)

The Mexican long-tongued bat has a long, slender nose with a leaf-like structure on the base of the nose. The total range for this species is from southeastern Arizona, southwestern New Mexico, and California south through Central America to Venezuela. In Arizona, the Mexican long-tongued bat is found from the Chiricahua Mountains extending as far north as the Santa Catalina Mountains and west to the Baboquivari Mountains. Habitat for this bat is typically within canyons of mixed oak-conifer forests in mountains at elevations ranging from 1,082 to 2,231 m (3,550 – 7,320 ft) (AGFD 1994). This species do not congregate in sizeable maternity or bachelor colonies like *Leptonycteris* bats do (Hoffmeister 1986). They feed on nectar and pollen, especially from paniculate agaves (AGFD 1994).

Populations of Mexican long-tongued bats in Arizona appear to be highly variable (AGFD 1994) and there is no evidence of a long-term decline or any clear trend. The limitation of riparian zones and the distribution of food plants may limit populations of this species in Arizona and loss of riparian vegetation may be a greater threat to this species than human disturbance at particular roost sites (Pima County 2001). The proposed TEP transmission line will not cross near known roost sites, but potential foraging habitat may be disturbed during construction; however, these disturbances will be isolated and will impact only a small percentage of potential habitat. Furthermore, transplanting of agave plants also will minimize impacts. Impacts to this species are not likely to result in a trend toward federal listing or loss of viability.

Mexican vine snake (*Oxibelis aeneus*)

The Mexican vine snake has an elongated head, pointed snout, and is thin bodied with an ash gray to yellow-brown and tan coloring. The total range for this species is from extreme southern Arizona south to Brazil. In Arizona, this species occurs in the Tumacacori, Pajarito, and Patagonia mountains in Santa Cruz County. Habitat for the Mexican vine snake consists of brush-covered hillsides and riparian areas with sycamore, oak, walnut and wild grape trees at elevations ranging from 914 to 1,768 m (3,000 – 5,800 ft) (AGFD 1991b).

Population trends for the Mexican vine snake are currently unknown. Populations in Arizona are at the extreme northern edge of the species range and distribution is limited,

with occurrences known from Sycamore Canyon (AGFD 1991b). A potential threat is the high interest by collectors for this species (AGFD 1991b). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the Mexican vine snake.

Osprey (*Pandion haliaetus*)

This raptor is dark brown on its back and white on the underparts with a prominent dark eye stripe. The total range for the osprey is from Alaska to Newfoundland, along the Atlantic and Pacific coastlines, and in the Rocky Mountains south through central and South America. Within Arizona, the osprey occurs primarily in the White Mountains, along the Mogollon Rim, and along the Salt and Verde rivers. In southeastern Arizona, this raptor is an uncommon spring and fall transient, usually seen at ponds and reservoirs. Nesting habitat of the osprey consists of coniferous trees along rivers and lakes at elevations ranging from 1,829 to 2,377 m (6,000 – 7,800 ft) (AGFD 1997d).

Osprey population trends in Arizona are not well known. Only about 20 nest sites are known in the southwest, all within Arizona. This raptor is threatened by loss of nesting habitat and foraging perch sites. It is also threatened by recreational use of nesting habitat, shooting, and pesticide poisoning on wintering grounds (AGFD 1997d).

Because no construction will occur in perennial aquatic habitats, the proposed action will have no effect on the population status of the osprey.

Rose-throated becard (*Pachyramphus aglaiae*)

The rose-throated becard is a big-headed, thick billed bird that breeds in southeast Arizona, southern Texas (rare visitor along the Rio Grande), south through Mexico to Costa Rica. This species winters from northern Mexico south through to its breeding range. Within Arizona, rose-throated becards have been found breeding along Sonoita and Arivaca creeks, Sycamore Canyon (Atascosa Mountains), and Patagonia. Historically, this species nested in Guadalupe Canyon (east of Douglas) and near Tucson. Rose-throated becards typically inhabit marshes of Sonoran desertscrub communities of open to dense vegetation of shrubs, low trees, and succulents dominated by paloverde, prickly pear, and saguaro. This species also is found in the desert riparian deciduous woodland communities of marsh-woodlands, especially of cottonwoods, that occur where desert streams provide sufficient moisture for a narrow band of deciduous trees and shrubs along the margins. In Arizona, the rose-throated becard is found at elevations ranging from 1,082 to 1,228 m (3,550 – 4,030 ft) (AGFD 2001g).

Population trends for the rose-throated becard are currently unknown. Potential threats to this species include disturbance from bird watchers and degradation and loss of native riparian habitat through overgrazing, urban development, and groundwater depletion (AGFD 2001g). Because known occurrences of this species are outside the project area, the proposed action will have no effect on the population status of the rose-throated becard.

Tarahumar frog (*Rana tarahumarae*)

The Tarahumara frog, is a medium-sized (adults range from 2.5 to 4.5 in [64 to 114 mm] in snout-vent length), drab green-brown frog with small brown to black spots on the body and dark crossbars on the legs. Throughout its range the Tarahumara frog is typically associated with canyons and deep "plunge pools" formed amidst boulders or in bedrock. Plunge pools in canyons with low mean flows (<0.2 cubic feet per second) and relatively steep gradients (> 60 m per km of stream) provide the best breeding sites. Permanent water is probably necessary for metamorphosis. Tarahumara frog habitats are located within oak, pine-oak woodland, or the Pacific coast tropical area (Sinaloa thornscrub and tropical deciduous forest).

In the United States, the species was known historically from six locales, including three from Santa Rita Mountains and three from Atascosa-Pajarito-Tumacacori Mountains complex, which are located north and west, respectively, of Nogales in Santa Cruz County, Arizona. Tarahumara frogs have been extirpated from all localities in Arizona. In September 2003, the USFWS announced plans to reintroduce this species back into suitable habitat in southern Arizona, including Sycamore Canyon.

Causes of population decline and extirpation are not clear, but the following factors have been implicated: winter cold, flooding or severe drought, competition with and predation by nonnative fish and bullfrogs, disease, habitat loss, and heavy metal poisoning. No direct impacts from the proposed TEP transmission line on the Tarahumara frog are anticipated. Indirect effects from increased erosion, increased risk of wildfire, or the introduction of nonnative species may impact individuals of this species, however, because of the distance of the project and the conservation measures (invasive species control, fire prevention plan, erosion control), only a small percentage of the population within the project area may be subject to potential impacts. Furthermore, those measures designed to minimize impacts to federally listed species within the potential reintroduction areas should provide adequate protection for this species. Therefore, impacts are not likely to result in a trend toward federal listing or loss of viability.

Thick-billed kingbird (*Tyrannus crassirostris*)

The thick-billed kingbird is a relatively stocky flycatcher with a large head and heavy bill. This kingbird occurs from southeastern Arizona and southwestern New Mexico south through western Mexico to western Guatemala. In Arizona, thick-billed kingbirds are most often seen around Sonoita and Arivaca creeks and in Madera and Guadalupe canyons. This species may occur in mountains of Pima, Santa Cruz and Cochise counties where there are drainages with well-developed riparian areas. Habitat for the thick-billed kingbird consists of broad-leaved, riparian forests usually with well-developed large sycamores and cottonwoods at elevations ranging from 914 to 1,981 m (3,000 – 6,500 ft) (Tibbitts 1991).

Present distribution of the thick-billed kingbirds in Arizona is very limited. Potential threats include human recreational activities, encroachment of human development into breeding habitat, woodcutting, grazing, and groundwater depletion (Tibbitts 1991).

Because no potential habitat occurs within the project area, the proposed action will have no effect on the population status of the thick-billed kingbird.

Tropical Kingbird (*Tyrannus melancholicus*)

The tropical kingbird is a large tyrant-flycatcher with a large bill and long, slightly notched tail. The tropical kingbird ranges from southeastern Arizona through western and central Mexico to central Argentina. Breeding birds have been found in Tucson, along the Santa Cruz Valley from Green Valley south, east of Phoenix in the Salt River Valley, to the San Pedro Valley. This species also has been reported from Sopor Wash. The Tropical Kingbird inhabits open and semi-open areas with scattered trees and shrubs. Also found in urban areas and roadsides with tall human-made fixtures (Stouffer and Chesser 1998).

Tropical kingbirds seem to persist or even thrive in developed areas. No negative effects of human activities have been reported (Stouffer and Chesser 1998). The proposed transmission line may cross potential habitat for this species; however, construction within riparian habitats will be minimized to the greatest extent possible. Placement of the transmission line may impact individual tropical kingbirds, however because of the linear nature of the project, only a small percentage of the population within the project area may be impacted. Furthermore, populations of this species occur outside of the project area. Therefore, impacts to tropical kingbirds are not likely to result in a trend toward federal listing or loss of viability.

6.0 LITERATURE CITED

- Abbate, D. J., A. Ditty, W. S. Richardson, and R. Olding. 1996. Cactus ferruginous pygmy-owl surveys and nest monitoring in the Tucson Basin area, Arizona. Final Report Internal Enhancement #U95503. Arizona Game and Fish Department, Phoenix, Arizona.
- _____, W. S. Richardson, R. L. Wilcox, M. J. Terrio, and S. M. Belhumeur. 1999. Cactus ferruginous pygmy-owl investigations in Pima and Pinal Counties, Arizona: 1997-1998. Region V Wildlife Program. Arizona Game and Fish Department, Tucson, AZ. 83 pp.
- _____, _____, _____, and S. Lantz. 2000. Cactus ferruginous pygmy-owl investigations in Pima and Pinal Counties, Arizona: 1999. Region V Wildlife Program. Arizona Game and Fish Department, Tucson, AZ. 37 pp.
- Aiken, C. E. H. 1937. (E.R. Warren, Ed.). Birds of the Southwest. Colorado College Publication, General Series No. 212:1-73.
- Alcorn, S. M., S. E. McGregor and G. Olin. 1962. Pollination requirements of the organpipe cactus. Cactus and Succulent Journal 34(5): 135-138.
- Allison, L. J., J. Rourke, and T. McCarthy. 2000. Characterizing vegetation in nesting and non-nesting plots for southwestern willow flycatchers within the same patch of continuous riparian vegetation. Page 15 in Abstracts of presented papers and posters, The Ecology and Conservation of the Willow Flycatcher, 24-26 October 2000, Arizona State University, Tempe, AZ.
- American Ornithologists' Union. 1957. Check-list of North American birds, 5th ed. American Ornithologists' Union, Baltimore, MD.
- Anderson, D.E., O.J. Rongstad, and W.R. Mytton. 1990. Home range changes in post-breeding raptors exposed to increased human activity levels in southeastern Colorado. Wildlife Society Bulletin. 18: 134-142.
- Arizona Game and Fish Department (AGFD). 1988. Threatened native wildlife in Arizona. Arizona Game and Fish Department, Phoenix, AZ. 32 pp.
- _____. 1991a. Chiltepine (*Capsicum annuum* var. *glabriusculum*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.

- _____. 1991b. Mexican vine snake (*Oxibelis aeneus*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 2 pp.
- _____. 1992. Sweet acacia (*Acacia smallii*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.
- _____. 1993. Arizona wildlife views – bats of Arizona. Volume 36, Number 8. 36 pp.
- _____. 1994. Mexican long-tongued bat (*Choeronycteris mexicana*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 1995a. Report on Sonora chub collection in California Gulch. Arizona Game and Fish Department, Phoenix, AZ.
- _____. 1995b. Western barking frog (*Eleutherodactylus augusti cactorum*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 1995c. Great Plains narrow-mouthed toad (*Gastrophryne olivacea*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 1996. Species of Special Concern. Arizona Game and Fish Department, Phoenix, AZ.
- _____. 1997a. Bartram's stonecrop (*Graptopetalum beartramii*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.
- _____. 1997b. Lowland leopard frog (*Rana yavapaiensis*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 1997c. Cave myotis (*Myotis velifer*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.
- _____. 1997d. Osprey (*Pandion haliaetus*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.

- _____. 1998a. Beardless chinch weed (*Pectis imberbis*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.
- _____. 1998b. Gentry indigo bush (*Dalea tentaculoides*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.
- _____. 1998c. Large-flowered blue star (*Amsonia grandiflora*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 9 pp.
- _____. 1998d. Santa Cruz beehive cactus (*Coryphantha recurvata*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.
- _____. 1998e. Santa Cruz striped agave (*Agave parviflora* ssp. *parviflora*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.
- _____. 1998f. American peregrine falcon (*Falco peregrinus anatum*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.
- _____. 1998g. Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 1998h. Southern pocket gopher (*Thomomys umbrinus intermedius*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.
- _____. 1999a. Alamos deer vetch (*Lotus alamosanus*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 1999b. Catalina beardtongue (*Penstemon discolor*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.
- _____. 1999c. Chihuahuan sedge (*Carex chihuahuensis*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.

- _____. 1999d. Chiricahua Mountain brookweed (*Samolus vagans*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 1999e. Nodding blue-eyed grass (*Sisyrinchium cernuum*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.
- _____. 1999f. Santa Cruz star leaf (*Choisya mollis*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.
- _____. 1999g. Supine bean (*Macroptilium supinum*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.
- _____. 1999h. Thurber hoary pea (*Tephrosia thurberi*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 1999i. Virlet paspalum (*Paspalum virletii*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 1999j. Weeping muhly (*Muhlenbergia xerophila*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 1999k. Woolly fleabane (*Laennecia eriophylla*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 2000a. Arid throne fleabane (*Erigeron arisolis*). Unpublished draft abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 2000b. Arizona giant sedge (*Carex ultra*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.
- _____. 2000c. Foetid passionflower (*Passiflora foetida*). Draft Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.

- _____. 2000d. Lumholtz nightshade (*Solanum lumholtzianum*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 2000e. Mock-pennyroyal (*Hedeoma dentatum*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.
- _____. 2000f. Seeman groundsel (*Senecio carlomasonii*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 2000g. Sonoran noseburn (*Tragia laciniata*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.
- _____. 2000h. Superb beardtongue (*Penstemon superbus*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 2000i. Thurber's morning glory (*Ipomoea thurberi*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 2000j. Wiggins milkweed vine (*Metastelma mexicanum*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- _____. 2000k. Northern gray hawk (*Asturina nitida maxima*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.
- _____. 2001a. Arizona metalmark (*Calephelis rawsoni arizonensis*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 3 pp.
- _____. 2001b. Giant spotted whiptail (*Cnemidophorus burti strictogrammus*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.
- _____. 2001c. Mexican garter snake (*Thamnophis eques megalops*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.

- _____. 2001d. California leaf-nosed bat (*Macrotus californicus*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 5 pp.
- _____. 2001e. Sonoran Desert tortoise (*Gopherus agassizii*). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 8 pp.
- _____. 2001f. Elegant trogon (*Trogon elegans*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.
- _____. 2001g. Rose-throated becard (*Pachyramphus aglaiae*). Draft unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 7 pp.
- _____. 2002. Loggerhead shrike (*Lanius ludovicianus*). Draft unpublished animal abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 4 pp.

Arizona Interagency Desert Tortoise Team. 1996. Management plan for the Sonoran Desert population of the desert tortoise in Arizona.

Avian Power Line Interaction Committee (APLIC). 1996. Suggested practices for raptor protection on power lines: the state of the art in 1996. Edison Electric Institute and Raptor Research Foundation. Washington, D.C.

Bagley, B. E., D. A. Hendrickson, F. J. Abarca, and S. Hart. 1991. Status of the Sonoran topminnow (*Poeciliopsis occidentalis*) and desert pupfish (*Cyprinodon macularius*) in Arizona. Special Report on Project E5-2, Job 9, Title VI of the Endangered Species Act. Arizona Game and Fish Department, Phoenix, AZ.

Bahre, C. J. 1991. A legacy of change. Historic human impact on vegetation in the Arizona borderlands. University of Arizona Press, Tucson, AZ.

Baird, S. F. and C. Girard. 1853. Description of new species of fishes collected by Mr. John H. Clark, on the U.S.-Mexican boundary survey, under Lt. Col. Jas. D. Graham. Proceedings of the Academy of Natural Sciences of Philadelphia 6: 387-390.

Bartlett, P. and R. Bartlett. 1999. A field guide to Texas reptiles and amphibians. Gulf Publishing Company, Houston, TX.

Bell, G. 1984. Sonora chub, Sycamore Canyon. memo, USDA Forest Service, Coronado National Forest, Nogales, AZ. 13pp.

- Belnap, J. 1992. Potential role of cryptobiotic soil crusts in semiarid rangelands. Paper presented at the Symposium on Ecology, Management, and Restoration of Intermountain Annual Rangelands, Boise, ID, May 18-22, 1992.
- Belsky, A. J., and D. M. Blumenthal. 1997. Effects of livestock grazing on stand dynamics and soils in upland forests of the interior west. *Conservation Biology* 11(2): 315-327.
- Bendire, C. E. 1892. *Glaucidium phalaenoides* (Daudain), Ferruginous pygmy owl. Pages 409-411 *In* Life Histories of North American Birds with special reference to their habits and eggs. Smithsonian Institute, U.S. National Museum Special Bulletin No. 1.
- Berger L., R. Speare, P. Daszak, D. E. Green, A. A. Cunningham, C.L. Goggins, R. Slocombe, M. A. Ragan, A. D. Hyatt, K. R. McDonald, H. B. Hines, K. R. Lips, G. Marantelli, and H. Parkes. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. *Proceedings of the National Academy of Science, USA* 95: 9031-9036.
- Bevanger, K. 1994. Bird interactions with utility structures: collision and electrocution, causes and mitigating measures. *Ibis* 54: 419-431.
- Blackburn, W. H. 1984. Impacts of grazing intensity and specialized grazing systems on watershed characteristics and responses. Pages 927-983 *In* Developing strategies for rangeland management. National Research Council/National Academy of Sciences. Westview Press, Boulder, CO.
- Bloomquist, S. M., K. J. Field, and M. J. Sredl. 2002. General Visual Encounter Survey Protocol, Chiricahua leopard frog. Guidelines published for the Arizona Game and Fish Department, Phoenix, Arizona.
- Bockstanz, Lori. 1998. Herps of Texas – lizards: Texas Horned Lizard (*Phrynosoma cornutum*).
<http://www.zo.utexas.edu/research/txherps/lizards/phrynosoma.cornutum.html>.
22 September 1999.
- Brooks, J. E. 1985. Factors affecting the success of Gila topminnow introductions on four Arizona National Forests. Report to U.S. Fish and Wildlife Service, Office of Endangered Species, Albuquerque, New Mexico. Arizona Game and Fish Department, Phoenix, AZ.
- _____. 1986. Status of natural and introduced Sonoran topminnow (*Poeciliopsis o. occidentalis*) populations in Arizona through 1985. Report to U.S. Fish and

Wildlife Service, Office of Endangered Species, Albuquerque, New Mexico.
Arizona Game and Fish Department, Phoenix, AZ.

- Brown, D. E., C. H. Lowe, and J. F. Hausler. 1977. Southwestern riparian communities: their biotic importance and management in Arizona *In* R. R. Johnson and D. A. Jones [Eds.], Importance, preservation, and management of riparian habitats: a symposium. General Technical Report RM-43. USDA Forest Service, Denver, CO.
- _____. 1983a. On the status of the jaguar in the Southwest. *Southwestern Naturalist* 28: 459-460.
- _____. 1983b. The wolf in the southwest. University of Arizona Press, Tucson, AZ. 195 pp.
- _____. 1985. Black-bellied whistling duck. Pages 110 – 112 *In* Arizona Wetlands and Waterfowl. The University Press, Tucson, AZ.
- _____. 1991. Revival for El Tigre? *Defenders* 66(1): 27-35.
- _____. (Ed.). 1994. Biotic communities: southwestern United States and northwestern Mexico. University of Utah Press, Salt Lake City, UT. 342 pp.
- Brown, M. and F. J. Abarca. 1992. An update status report of the Sonoran topminnow, *Poeciliopsis occidentalis*, and desert pupfish, *Cyprinodon macularius*, in Arizona. Arizona Game and Fish Department, Phoenix.
- Browning, M. R. 1993. Comments on the taxonomy of *Empidonax traillii* (willow flycatcher). *Western Birds* 24: 241-257.
- Busby, F. E. and G. F. Gifford. 1981. Effects of livestock grazing on infiltration and erosion rates measured on chained and unchained pinyon-juniper sites in southeastern Utah. *Journal of Range Management* 34: 400-405.
- Carpenter, J. 1992. Summer habitat use of Sonora chub in Sycamore Creek, Santa Cruz County, Arizona. M.S. Thesis, University of Arizona, Tucson. 83 pp.
- _____. and O.E. Maughan. 1993. Macrohabitat of Sonora chub (*Gila ditaenia*) in Sycamore Creek, Santa Cruz County, Arizona. *Journal of Freshwater Ecology* 8: 265-278.
- Cartron, J. E., W. S. Richardson, and G. A. Proudfoot. 2000a. The cactus ferruginous pygmy-owl: taxonomy, distribution, and natural history. Pages 5-15 *In* J. E. Cartron and D. M. Finch [Eds.], Ecology and conservation of the cactus ferruginous pygmy-owl in Arizona. Gen. Tech. Rpt. RMRS-GTR-43. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT. 68 pp.

- Cartron, J. E., S. H. Soleson, S. Russell, G. A. Proudfoot, and W. S. Richardson. 2000b. The ferruginous pygmy-owl in the tropics and at the northern end of its range: habitat relationships and requirements. Pages 47-53 *In* J. E. Cartron and D. M. Finch [Eds.], Ecology and conservation of the cactus ferruginous pygmy-owl in Arizona. Gen. Tech. Rpt. RMRS-GTR-43. USDA Forest Service, Rocky Mountain Research Station, Ogden, UT.
- Chapman, D. W. 1988. Critical review of variables used to define effects of fines in redds of large salmonids. Transactions of the American Fisheries Society 117: 1-21.
- Clarkson, R. W. and J. C. Rorabaugh. 1989. Status of leopard frogs (*Rana pipiens* Complex) in Arizona and southeastern California. Southwestern Naturalist 34(4): 531-538.
- Cockrum, E.L. 1991. Seasonal distribution of northwestern populations of the long-nosed bat, *Leptonycteris sanborni*, Family Phyllostomidae. Anales Inst. Biol. Univ. Nac. Auton. Mexico, Ser. Zool. 62(2): 181-202.
- Constantine, D.G. 1966. New bat locality records from Oaxaca, Arizona and Colorado. Journal of Mammalogy 47(1): 125-126.
- _____. 1998. Range extensions of ten species of bats in California. Bulletin of Southern California Academy of Science 97(2): 49-75.
- Constantz, G. D. 1974. Reproductive effort in *Poeciliopsis occidentalis* (Poeciliidae). Southwestern Naturalist 19: 47-52.
- _____. 1975. Behavioral ecology of mating in the male Gila topminnow, *Poeciliopsis occidentalis* (Cyprinodontiformes: Poeciliidae). Ecology 56: 966-973.
- _____. 1976. Life history strategy of the Gila topminnow, *Poeciliopsis occidentalis*: a field evaluation of theory on the evolution of life histories. Ph.D. Dissertation, Arizona State University, Tempe.
- _____. 1979. Life history patterns of a livebearing fish in contrasting environments. Oecologia 40: 189-201.
- _____. 1989. Reproductive biology of poeciliid fishes. Pages 33-50 *In* G. K. Meffe and F. F. Snelson Jr. [Eds.], Ecology and Evolution of Livebearing Fishes (Poeciliidae). Prentice Hall, Englewood Cliffs.
- Corman, T. E. 1994. Black-bellied whistling duck. Page 18 *In* Nongame Field Notes. AGFD Wildlife News, Arizona.

- Coronado National Forest (CNF). 2000. FY 1999 Annual monitoring and evaluation report. Coronado National Forest report, 27 pp.
- Coues. E. 1872. A new bird to the United States. American Naturalist 6: 370.
- Cox, J. R., H. L. Morton, T. N. Johnsen, Jr., G. L. Jordan, S. C. Martin, and L. C. Fierro. 1984. Vegetation restoration in the Chihuahuan and Sonoran Deserts of North America. Rangelands 6: 112-116.
- _____. and G. B. Ruyle. 1986. Influence of climatic and edaphic factors on the distribution of *Eragrostis lehmanniana* Nees. in Arizona, U.S.A. Journal of the Grassland Society of South Africa 3: 25-29.
- Dalton, V. M. and D. C. Dalton. 1993. Assessment of the impacts of low-level military aircraft on *Leptonycteris curasoae*, an endangered bat, at Organpipe Cactus National Monument, Arizona. Contract Nos. USAF/Luke AFB F0260492MS359 and NPS/ORPI O.M. 1443 PX866092081. Report to Organpipe Cactus National Monument and 58th Civil Eng. Sq. Luke AFB. 54 pp.
- Dalton, V. M., D. C. Dalton and S. L. Schmidt. 1994. Roosting and foraging use of a proposed military training site by the long-nosed bat, *Leptonycteris curasoae*. Contract Nos. DACA65-94-M-0831 and DACA65-94-M-0753. Report to Luke Air Force Natural Resources Program. 34 pp.
- Davidson, C. 1996. Frog and toad calls of the Rocky Mountains. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, NY.
- Davidson, D., A. P. Pessier, J. E. Longcore, M. Parris, J. Jancovich, J. Brunner, D. Schock, and J. P. Collins. 2000. Chytridiomycosis in Arizona (USA) tiger salamanders. Page 23 *In* Conference and Workshop Compendium: Getting the Jump! On amphibian disease. Cairns, Australia, August 2000.
- DeBano, L. F. and L. J. Schmidt. 1989. Interrelationships between watershed condition and health of riparian areas of southwestern United States. Pages 45-52 *In* M. T. Billings, R. E. Gresswell, B. A. Barton, and J. L. Kershner [Eds.], Practical approaches to riparian resource management. An educational workshop. May 8-11, 1989. U.S. Bureau of Land Management, Billings, MT.
- Declining Amphibian Populations Task Force. 1993. Post-metamorphic death syndrome. Froglog 7: 1-2.
- Degenhardt, W. G., C. W. Painter, and A. H. Price. 1996. Amphibians and reptiles of New Mexico. University of New Mexico Press, Albuquerque, NM.

- Delaney, D. K., T. G. Grubb, P. Beier, L. L. Pater, and M. H. Reiser. 1999. Effects of helicopter noise on Mexican spotted owls. *Journal of Wildlife Management* 63: 60-76.
- Desert Tortoise Council. 1994 (Revised 1999). Guidelines for handling desert tortoises during construction projects. Edward L LaRue, Jr. [Ed.]. Wrightwood, CA. 19 pp.
- Dickerman, R. W. 1997. Geographic variation in southwestern U.S. and Mexican spotted owls, with the description of a new subspecies. Pages. 45-55 *In* R.W. Dickerman (Compiler), The era of Allan R. Phillips: A festschrift. Horizon Communications, Albuquerque, NM.
- Drost, C. A., M. K. Sogge, and E. Paxton. 1998. Preliminary diet study of the endangered southwestern willow flycatcher. Report to U. S. Bureau of Reclamation. USGS, Biological Resources Division/Colorado Plateau Research Station, Flagstaff, AZ. 26 pp.
- Fleming, T. H. 1991. Nectar corridors and the diet of migratory nectarivorous bats. *Bat Research News* 33: 71.
- _____. 1994. Lesser long-nosed bat recovery plan. U. S. Fish and Wildlife Service, Albuquerque, NM. 49 pp.
- _____. 1995. Lesser long-nosed bat recovery plan. U.S. Fish and Wildlife Service. Albuquerque, NM. Page 29.
- Forrest, R. E. 1992. Habitat use and preference of Gila topminnow. M.S. Thesis, University of Arizona, Tucson, AZ.
- Ganey, J. L. 1998. Spotted owl. Pages 170-174 *In*: R.L. Glinski [Ed.], The raptors of Arizona. University of Arizona Press, Tucson, AZ.
- _____. and R. P. Balda. 1989. Distribution and habitat use of Mexican spotted owls in Arizona. *Condor* 91: 355-361.
- _____, _____, J. K. Dwyer, B. E. Strohmeyer, and J. S. Jenness. 1998. Dispersal movements and survival rates of Mexican spotted owls in northern Arizona. *Wilson Bull.* 110: 206-217.
- _____ and J. L. Dick, Jr. 1995. Habitat relationships of the Mexican spotted owl: Current knowledge. Chapter 4 in Recovery plan for the Mexican spotted owl: Vol. II. U.S. Fish and Wildl. Serv., Albuquerque, NM.

- _____, R. B. Duncan, and W. M. Block. 1992. Use of oak and associated woodlands by Mexican spotted owls in Arizona. Pages 125-128 *In* P. F. Ffolliot, G. J. Gottfried, D. A. Bennett, V. M. Hernandez, C. A. Ortega-Rubio, and R. H. Hamre [Tech. Coords.], Ecology and management of oak and associated woodlands: perspectives in the southwestern United States and Mexico. Gen. Tech. Rep. RM-218, U.S. Forest Service, Ft. Collins, CO.
- Gentry, H. S. 1982. Agaves of Continental North America. University of Arizona Press, Tucson, AZ. Pages 443-447 and 538-545.
- Gerking, S. D. and D. V. J. Plantz. 1980. Size-biased predation by the Gila topminnow, *Poeciliopsis occidentalis* (Baird and Girard). *Hydrobiologia* 72: 179-191.
- Gifford, G. F. and R. H. Hawkins. 1978. Hydrologic impact of grazing on infiltration: a critical review. *Water Resour. Res.* 14: 305-313.
- Glenn, W. 1996. Eyes of fire: encounter with a borderlands jaguar. Printing Corner Press, El Paso, TX.
- Glinski, R. L. 1998. The raptors of Arizona. Arizona Game and Fish Department and University of Arizona Press, Tucson, AZ. 220 pp.
- Goldman, E. A. 1932. The jaguars of North America. *Proc. Biol. Soc. Washington* 45: 143-146.
- Gori, D., J. Malusa, P. L. Warren, and E. S. Monarque. 1991. Population studies of sensitive plants of the Huachuca, Patagonia, and Atascosa Mountains, Arizona. The Nature Conservancy for Coronado National Forest, P.O. 40-8197-0-0215.
- Green, L. R. 1977. Fuelbreaks and other fuel modifications for wildland fire control. *Agric. Handb.* 499. Washington, DC: U.S. Department of Agriculture, Forest Service. 79 pp.
- Greenberg, C. H.; Crownover, S. H.; Gordon, D. R. 1997. Roadside soils: a corridor for invasion of xeric scrub by nonindigenous plants. *Natural Areas Journal*. 17(2): 99-109.
- Gucinski, H.; M. J. Furniss, R. R. Ziemer, and M. H. Brookes. 2001. Forest roads: a synthesis of scientific information. Gen. Tech. Rep. PNWGTR-509. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 103 pp.
- Gunderson, D. R. 1968. Floodplain use related to stream morphology and fish populations. *Journal of Wildlife Management* 32(3): 507-514.

- Gutiérrez, R. J., A. B. Franklin, and W. S. Lahaye. 1995. Spotted owl (*Strix occidentalis*). North American Birds No. 179 (A Poole and F. Gill, eds.). Acad. Nat. Sci, Philadelphia, and the American Ornithologists' Union, Washington, D.C.
- Hale, S. F., and C. J. May. 1983. Status report for *Rana tarahumarae* Boulenger. Arizona Natural Heritage Program, Tucson. Report to Office of Endangered Species, U.S. Fish and Wildlife Service, Albuquerque, NM.
- _____. and J. L. Jarchow. 1988. The status of the Tarahumara frog (*Rana tarahumarae*) in the United States and Mexico: part II. Report to the Arizona Game and Fish Department, Phoenix, Arizona, and the Office of Endangered Species, U.S. Fish and Wildlife Service, Albuquerque, NM.
- _____. 1992. A survey of the historic and potential habitat for the Tarahumara frog, (*Rana tarahumarae*) in Arizona. Report to the Arizona Game and Fish Department, Phoenix, AZ.
- Hall, E. R. 1981. The mammals of North America. Second Edition. John Wiley and Sons, New York, 2:601-1181 + 90.
- Harness, R. E. and K. R. Wilson. 2000. Raptor electrocutions and outages: a review of rural utility records spanning 1986-1996. Pages 765-771 *In* R. D. Chancellor and B. U. Meyburg [Eds.], Raptors at risk. Hancock House Publishers, Blaine, WA.
- Harris, L. K. and R. B. Duncan. 1998. Cactus ferruginous pygmy-owl 1998 survey of southern Arizona, final report. United States Fish and Wildlife Service grant agreement # 1448-20181-98-G915. 39 pp.
- _____. and _____. 1999. Pima County cactus ferruginous pygmy-owl survey, final report. Pima County Government Contract #07-26-H-125828-0499. 78 pp.
- Harvey, M. J., J. S. Altenbach, and T. L. Best. 1999. Bats of the United States. Arkansas Game and Fish Commission and U.S. Fish and Wildlife Service – Asheville Field Office. 64 pp.
- Hatten, J., C. Paradzick, and M. Sumner. 2000. Constructing a nest-site suitability model for the southwestern willow flycatcher in Arizona. Page 20 *In* Abstracts of presented papers and posters, The Ecology and Conservation of the Willow Flycatcher, 24-26 October 2000, Arizona State University, Tempe.
- Hayward, B. and E. L. Cockrum. 1971. The natural history of the western long-nosed bat, *Leptonycteris sanborni*. Western New Mexico University, Research Science 1(2): 74-123.

- Heath, W. G. 1962. Maximum temperature tolerance as a function of constant temperature acclimation in the Gila topminnow, *Poeciliopsis occidentalis*. Ph.D. Dissertation, University of Arizona, Tucson.
- Hendrickson, D. A. and L. Juarez-Romero. 1990. Los peces de la cuenca del Rio de la Concepcion, Sonora, Mexico, y el estatus del charalito Sonorense, *Gila ditaenia*, una especie en amenaza de extincion. *Southwestern Naturalist* 35(2): 177-187.
- Hillis, D. M., J. S. Frost, and D. A. Wright. 1983. Phylogeny and biogeography of the *Rana pipens* complex: a biochemical evaluation. *Systematic Zoology*. 32(2): 132-143.
- Hoffmeister, D. F. 1986. Mammals of Arizona. University of Arizona Press, Tucson, AZ. 602 pp.
- Howell, D. J. and B. S. Roth. 1981. Sexual reproduction in agaves: the benefits of bats; cost of semelparous advertising. *Ecology* 62: 3-7.
- Howell, S. N. G. and S. Webb. 1995. A guide to the birds of Mexico and northern Central America. Oxford University Press, New York, NY. 851 pp.
- Hubbs, C. L. and R. R. Miller. 1941. Studies of the fishes of the order Cyprinodontes. XVII – genera and species of the Colorado River system. *Occasional Papers of the Museum of Zoology, University of Michigan* 433: 1-9.
- Hubbard, J. P. 1987. The status of the willow flycatcher in New Mexico. *Endangered Species Program, New Mexico Department of Game and Fish, Santa Fe, NM*. 29 pp.
- Hughes, J. M. 1999. Yellow-billed cuckoo (*Coccyzus americanus*). In *The Birds of North America*, No. 418 (A. Poole and F Gill, eds.). The Birds of North America, Inc., Philadelphia, PA. 28 pp.
- Jennings, M. R. 1987. Status of the western painted turtle (*Chrysemys picta bellii*) in Arizona. *Journal of the Arizona-Nevada Academy of Sciences* 22: 129-133.
- Johnson, R. R. and L.T. Haight. 1985. Avian use of xeroriparian ecosystems in the North American warm deserts. Pages 156-160 In R. R. Johnson et al., technical coordinator. *Riparian ecosystems and their management: reconciling conflicting uses*.
- Kearney, T. H. and R. H. Peebles. 1960. Arizona flora – 2nd edition. University of California Press, Berkeley and Los Angeles, CA. 1,085 pp.

- Keitt, T., A. B. Franklin, and D. Urban. 1995. Landscape analysis and metapopulation structure. Chapter 3 in Recovery plan for the Mexican spotted owl: Vol. II. U.S. Fish and Wildl. Serv., Albuquerque, NM.
- Kerlinger, P. 2000. Avian mortality at communication towers: a review of recent literature, research, and methodology. USFWS Office of Migratory Bird Management. 38 pp.
- Lange, K. K. 1960. The jaguar in Arizona. Transactions of the Kansas Academy of Science 63: 96-101.
- Lesh, T. D. and T. E. Corman. 1995. Cactus ferruginous pygmy-owl surveys in Arizona: 1993-1995. Nongame and Endangered Wildlife Program Technical Report 76. Arizona Game and Fish Department, Phoenix, AZ. 23 pp.
- Loncore, J. E., A. P. Pessier, and D. K. Nichols. 1999. *Batrachyrium dendrobatidis* gen. Et sp. Nov., a chytrid pathogenic to amphibians. Mycologia 91(2): 219-227.
- Lonsdale, W. M and A. M. Lane. 1994. Tourist vehicles as vectors of weed seeds in Kadudu National Park, northern Australia. Biological Conservation 69(3): 277-283.
- Lyon, L. J. 1983. Road density models describing habitat effectiveness for elk. Journal of Forestry. 81: 592-595.
- Marsh, P. C. and W. L. Minckley. 1990. Management of endangered Sonoran topminnow at Bylas Springs, Arizona. Description, critique and recommendations. Great Basin Naturalist 50(3): 265-272.
- Marti, C. D. 2002. Enhancing raptor populations, a technique manual. The Peregrine Fund. Boise, ID. 77 pp.
- Maynard, W. R. 1995. Summary of 1994 survey effort in New Mexico for southwestern willow flycatcher (*Empidonax traillii extimus*). Contract #94-516-69. New Mexico Department of Game and Fish, Santa Fe, New Mexico. 48 pp.
- McCarthy, T. D., C. E. Paradzick, J. W. Rourke, M. W. Sumner, and R. F. Davidson. 1998. Arizona partners in flight southwestern willow flycatcher 1997 survey and nest monitoring report. Report to the Bureau of Reclamation, Phoenix, AZ.
- McDonald, C. B., J. Anderson, J. C. Lewis, R. Mesta, A. Ratzlaff, T. J. Tibbitts, and S. O. Williams. 1991. Mexican Spotted owl (*Strix occidentalis lucida*) status report. U.S. Fish and Wildl. Serv., Albuquerque, NM.
- McGregor, S. E., S. M. Alcorn, and G. Olin. 1962. Pollination and pollinating agents of the saguaro. Ecology 43: 259-267.

- McNeil, R., J. R. Rodriguez Sr., and H. Ouellet. 1985. Bird mortality at a power transmission line in northeastern Venezuela. *Biological Conservation* 31: 151-165.
- McPherson, G. R. 1995. The role of fire in desert grasslands. Pages 130-151 *In* M. P. McClaran and T. R. Van Devender [Eds.], *The Desert Grassland*. University of Arizona Press, Tucson, AZ.
- Mech, L. D. 1973. Wolf numbers in the Superior National Forest of Minnesota. Res. Pap. NC-97. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Research Experiment Station. 10 pp.
- Meffe, G. K., D. A. Hendrickson, and W. L. Minckley. 1983. Factors resulting in decline of the endangered Sonoran topminnow, *Poeciliopsis occidentalis* (Antheriniformes: Poeciliidae) in the United States. *Biological Conservation* 25:135-159.
- _____. 1984. Effects of abiotic disturbance on coexistence of predator-prey fish species. *Ecology* 65(5): 1525-1534.
- Miller, R. R. 1945. A new cyprinid fish from southern Arizona, and Sonora, Mexico, with the description of a new subgenus of *Gila* and a review of related species. *Copeia* 1945: 104-110.
- Minckley, W. L. and J. E. Deacon. 1968. Southwestern fishes and the enigma of "endangered species." *Science* 159: 1424-1432.
- _____. 1973. *Fishes of Arizona*. Arizona Game and Fish Department, Sims Printing Company, Inc., Phoenix, AZ. 293 pp.
- _____. and J. E. Brooks. 1985. Transplantations of native Arizona fishes: records through 1980. *Journal of the Arizona-Nevada Academy of Sciences* 20(2): 73-90.
- Mladenoff, D. J., T. A. Sickley, R. G. Haight, and A. P. Wydevens. 1995. A regional landscape analysis and prediction of favorable gray wolf habitat in the northern Great Lakes region. *Conservation Biology* 9(2): 279-294.
- Monson, G. and A. R. Philips. 1981. Annotated checklist of the birds of Arizona, 2nd edition, University of Arizona Press, Tucson, AZ. 292 pp.
- _____. 1987. An "almost certain" ferruginous pygmy-owl was heard along lower Aravaipa Canyon (Woods Ranch now owned by TNC) on 28 July 1987. *American Birds* 41:1471.

- _____. 1998. Ferruginous pygmy-owl. Pages 159-161 *In* R. Glinski [Ed.]. The Raptors of Arizona. University of Arizona Press, Tucson, AZ. 220 pp.
- Morell, V. 1999. Are pathogens felling frogs? *Science* 284: 728-731.
- Morrison, J. L. 1996. Crested Caracara (*Caracara plancus*) *In* The Birds of North America, No. 249 (A. Poole and F. Gill, eds.). The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, DC.
- Muiznieks, B. D., S. J. Sferra, T. E. Corman, M. K. Sogge, and T. J. Tibbitts. 1994. Arizona Partners in Flight southwestern willow flycatcher survey 1993. Draft report: Nongame and endangered wildlife program, Arizona Game and Fish Department, Phoenix, AZ. Draft of April 1994. 28 pp.
- Nelson, E.W. and E.A. Goldman. 1933. Revision of the jaguars. *Journal of Mammalogy* 14:221-240.
- New Mexico Game and Fish Department and The Fish and Wildlife Information Exchange. 2000. Five-Stripped Sparrow (*Aimophila quinquestriata*). [Web page] No archive known [Accessed 7 June 2002]. BISON.
http://www.fw.vt.edu/fishex/nmex_main/species/041830.htm
- Nobel, T. A. 1995. Birds and power lines: selected interaction and managment issues in the electric utility industry. M. S. Thesis, Prescott College, Prescott, AZ.
- Nowak, R. M. 1994. Walker's bats of the world. Johns Hopkins University Press, Baltimore, MD. 287 pp.
- Paradzick, C. E., R. F. Davidson, J. W. Rourke, M. W. Sumner, and T. D. McCarthey. 1999. Southwestern willow flycatcher 1998 survey and nest monitoring report. Nongame and Endangered Wildlife Program, Arizona Game and Fish Department, Phoenix, AZ, Technical Report 141.
- _____, _____, _____, _____, A. M. Wartell, and T. D. McCarthey. 2000. Southwestern willow flycatcher 1999 survey and nest monitoring report. Nongame and Endangered Wildlife Program Technical Report 151. Arizona Game and Fish Department, Phoenix, AZ. 93 pp.
- Parsons, D. R. 1996. Case study: the Mexican wolf. Pages 101-123 *In* E. A. Herrera and L. F. Huenneke [Eds.] New Mexico's Natural Heritage: Biological Diversity in the Land of Enchantment. New Mexico Journal of Science, Volume 36.
- Peterson, R. T. 1990. A field guide to western birds. Third Edition. Houghton Mifflin Company, Boston, MA. 432 pp.
- Phillips, A., J. Marshall, and G. Monson. 1983. The birds of Arizona. University of

- Arizona Press, Tucson, AZ. 212 pp.
- Phillips, A. R. 1948. Geographic variation in *Epidonax traillii*. *The Auk* 65: 507-514.
- _____, J.T. Marshall Jr., and G. Monson. 1964. *The Birds of Arizona*. University of Arizona Press, Tucson, AZ. 220 pp.
- Pima County. 2001. Priority vulnerable species: analysis and review of species proposed for coverage by the multiple-species conservation plan DRAFT. Pima County, AZ. 385 pp.
- Platz, J. E. and J. S. Mecham. 1979. *Rana chiricahuensis*, a new species of leopard frog (*Rana pipiens* Complex) from Arizona. *Copeia* 1979(3): 383-390.
- _____. and _____. 1984. *Rana chiricahuensis*. *Catalogue of American Amphibians and Reptiles* 347.1.
- Postovit, H. R. and B. C. Postovit. 1987. Impacts and mitigation techniques. Pages 183-213 *In* G. B. Pendleton, B. A. Mildsap, K. W. Cline, and D. M. Bird [Eds.], *Raptor management techniques manual*. National Wildlife Federation, Washington, D.C. Scientific Technical Series 10.
- Proudfoot, G. and S. M. Beasom. 1997. Food habits of nesting ferruginous pygmy-owls in southern Texas. *Wilson Bulletin* 109:741-748.
- _____. and R. D. Slack. 2001. Comparisons of ferruginous pygmy-owl mtDNA at local and international scales. Department of Wildlife and Fisheries Sciences, Texas A & M University. A Report for Pima County. 11 pp.
- Pyle, P. 1997. Identification guide to North American birds. Part I Columbidae to Ploceidae. Slate Creek Press, Bolinas, CA.
- Reichenbacher, F. W. and R .B. Duncan. 1992. Diet of Mexican spotted owls on National Forest system lands in Arizona and New Mexico. Final report to USDA, Forest Service, Southwestern Regional Office, Albuquerque, NM.
- Richardson, W. S., J. E. Cartron, D. J. Krueper, L. Turner, and T. H. Skinner. 2000. The status of the cactus ferruginous pygmy-owl in Arizona: Population surveys and habitat assessment. Pages 27-39 *In*: J. E. Cartron and D. M. Finch [Eds.], *Ecology and conservation of the cactus ferruginous pygmy-owl in Arizona*. General Technical Report, RMRS-GTR-43, Ogden, Utah. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 68 pp.
- Ricklefs, R. E. 1990. *Ecology*. 3rd ed. W.H. Freeman Co., New York, NY.

- Ridgely, R. S. and G. Tudor. 1994. The birds of South America: suboscine passerines. University of Texas Press, Austin, TX.
- Rinne, J. N. 1976. Cyprinid fishes of the genus *Gila* from the lower Colorado River basin. The Wasmann Journal of Biology 34: 65-107.
- Rogers, G. F. and J. Steele. 1980. Sonoran desert fire ecology. Pages 15 -16 In M. A. Stokes and J. H. Dieterich [Tech. Coord.]. Proceedings of the fire history workshop. United States Forest Service General Technical Report RM-81.
- Roller, P. S. 1996. Distribution, growth and reproduction of Pima pineapple cactus (*Coryphantha scheeri* Kuntz var. *robustispina* Schott). M. S. Thesis, University of Arizona.
- Rosen, P. C., C. R. Schwalbe, D. A. Parizek, P. A. Holm, and C. H. Lowe. 1994. Introduced aquatic vertebrates in the Chiricahua region: effects on declining native ranid frogs. Pages 251-261 In L. F. DeBano, G. J. Gottfried, R. H. Hamre, C. B. Edminster, P. F. Ffolliott, and A. Ortega-Rubio [Tech. Coords.], Biodiversity and management of the Madrean Archipelago. USDA Forest Service, General Technical Report RM-GTR-264.
- _____, _____, and S. S. Sartorius. 1996a. Decline of the Chiricahua leopard frog in Arizona mediated by introduced species. Report to Heritage program, Arizona Game and Fish Department, Phoenix, AZ. IIPAM Project No. I92052.
- _____, S. S. Sartorius, C. R. Schwalbe, P. A. Holm, and C. H. Lowe. 1996b. Draft annotated checklist of the amphibians and reptiles of the Sulphur Springs Valley, Cochise County, Arizona. Final Report, part 1, to the Arizona game and Fish Department, Phoenix. Heritage Program, IIPAM Project No. I92052.
- Rostagno, C. M. 1989. Infiltration and sediment production as affected by soil surface conditions in a shrubland of Patagonia, Argentina. Journal of Range Management 2: 382-385.
- Rudis, V. A. 1995. Regional forest fragmentation effects on bottomland hardwood community types and resource values. Landscape Ecology 10(5): 291-307.
- San Diego Natural History Museum. 1995. *Empononax traillii extimus* in California. The willow flycatcher workshop. 17 November 1995. 66 pp.
- Salazar, L. A. and A. Gonzalez-Caban. 1987. Spatial relationship of a wildfire, fuelbreaks, and recently burned areas. Western Journal of Applied Forestry 2(2): 55-58.
- Schoenherr, A. A. 1974. Life history of the topminnow, *Poeciliopsis occidentalis* (Baird and Girard) in Arizona, and an analysis of its interaction with the mosquitofish

- Gambusia affinis* (Baird and Girard). Ph.D. Dissertation, Arizona State University, Tempe.
- _____. 1977. Density dependent and density independent regulation of reproduction in the Gila topminnow, *Poeciliopsis occidentalis* (Baird and Girard). Ecology 58:438-444.
- Schultz, R. J. 1961. Reproductive mechanism of unisexual and bisexual strains of the viviparous fish *Poeciliopsis*. Evolution 15:302-325.
- Secretaria de Desarrollo Social. 1994. NORMA oficial Mexicana NOM-059-ECOL01994, que determina las especies y subespecies de flora y fauna silvestres y acuaticas en peligro de extincion, amenazadas, raras y sujetas a proteccion especial, y que establece especificaciones para su proteccion. Diaro Oficial 488(10): 2-60.
- Sferra, S. J., R. A. Meyer, and T. E. Corman. 1995. Arizona Partners in Flight 1994 southwestern willow flycatcher survey. Final Technical Report 69. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, AZ. 46 pp.
- _____, T. E. Corman, C. E. Paradzick, J. W. Rourke, J. A. Spencer, and M. W. Sumner. 1997. Arizona Partners in Flight southwestern willow flycatcher survey 1993-1996 summary report. Technical Report. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, AZ. 97 pp.
- Simms, J. K. and K. M. Simms. 1992. What constitutes quality habitat for Gila topminnow (*Poeciliopsis occidentalis*)? An overview of habitat parameters supporting a robust population at Cienega Creek, Pima County, AZ. Abstract. Proceedings of the Desert Fishes Council 22-23:82.
- Simons, L. H. 1987. Status of the Gila topminnow (*Poeciliopsis o. occidentalis*) in the United States. Special Report on Project E-1, Title VI of the Endangered Species Act of 1973, Arizona Game and Fish Department, Phoenix.
- Smith, A. B., C. E Paradzick, A. A. Woodward, P. E. T. Dockens, and T. D. McCarthy. 2002. Southwestern willow flycatcher 2001 survey and nest monitoring report. Technical Report 191. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, AZ. 63 pp.
- Sogge, M. K. and T. J. Tibbitts. 1992. Southwestern willow flycatcher (*Empidonax trailli extimus*) surveys along the Colorado River in Grand Canyon National Park and Glen Canyon National Recreation Area. NPS CPSU/Northern Arizona University, Flagstaff, AZ. 43 pp.

- _____, _____, and S. J. Sferra. 1993. Status of the southwestern willow flycatcher along the Colorado River between Glen Canyon Dam and Lake Mead – 1993. Summary Report. National Park Service Cooperative Park Studies Unit/Northern Arizona University, U. S. Fish and Wildlife Service, and Arizona Game and Fish Department, Flagstaff, AZ. 69 pp.
- _____. and _____. 1994. Distribution and status of the southwestern willow flycatcher along the Colorado River in the Grand Canyon – 1994. Summary Report. National Biological Service, Colorado Plateau Research Station, Northern Arizona University, Flagstaff, AZ. 37 pp.
- _____, R. M. Marshall, S. J. Sferra, and T. J. Tibbitts. 1997. A southwestern willow flycatcher survey protocol and breeding ecology summary. National Park Service/Colorado Plateau Research Station, Northern Arizona University, Technical Report NRTR-97/12. 37 pp.
- Soule, M. E. 1986. Conservation biology. The science of scarcity and diversity. Sinauer Association, Inc. Sinderland, MA. 584 pp.
- Speare, R. and L. Berger. 2000. Global distribution of chytridiomycosis in amphibians. <http://www.jcu.edu.au/school/phtm/PHTM/frogs/chyglob.htm>. 11 November 2000.
- Spencer, J. A., S. J. Sferra, T. E. Corman, J. W. Rourke, and M. W. Sumner. 1996. Arizona Partners in flight 1995 southwestern willow flycatcher survey. Technical Report 97, March 1996. Arizona Game and Fish Department, Phoenix, AZ. 69 pp.
- _____. and D. P. Humphrey. 1999. Species of concern at the Arizona Army National Guard's Florence Military Reservation, Pinal County, AZ. Arizona Army National Guard. 32 pp.
- Sredl, M. J. and J. M. Howland. 1994. Conservation and management of madrean populations of the Chiricahua leopard frog, *Rana chiricahuensis*. Arizona Game and Fish Department, Nongame Branch, Phoenix, AZ.
- _____, _____, J. E. Wallace, and L. S. Saylor. 1997. Status and distribution of Arizona's native ranid frogs. Pages 45-101 *In* M. J. Sredl [Ed.], Ranid frog conservation and management. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Technical Report 121.

- _____. and L. S. Saylor. 1998. Conservation and management zones and the role of earthen cattle tanks in conserving Arizona leopard frogs on large landscapes. Pages 211-225 *In* Proceedings of Symposium on Environmental, Economic, and Legal Issues Related to Rangeland Water Developments. November 13-15, 1997, Tempe, AZ.
- _____. and D. Caldwell. 2000. Wintertime populations surveys - call for volunteers. *Sonoran Herpetologist* 13: 1.
- State of Arizona. 1990. Final report and recommendations of the Governor's riparian habitat task force. Executive Order 89-16. Streams and riparian resources. October 1990. Phoenix, AZ. 28 pp.
- Stiles, F. G. and A. F. Skutch. 1989. A guide to the birds of Costa Rica. Comstock, Ithaca, New York. 364 pp.
- Stouffer, P. C. and R. T. Chesser. 1998. Tropical Kingbird (*Tyrannus melancholicus*) *In* A. Poole and F. Gill, [Eds.], The Birds of North America, No. 358. The Academy of Natural Sciences, Philadelphia, PA, and The American Ornithologists' Union, Washington, DC.
- Stromberg, J. C., J. A. Tress, J. D. Wilkins, and S. D. Clark. 1992. Response of velvet mesquite to groundwater decline. *Journal of Arid Environments* 23: 45-58.
- _____. 1993a. Fremont cottonwood-Goodding willow riparian forests: a review of their ecology, threats, and recovery potential. *Journal of the Arizona-Nevada Academy of Science* 26(3): 97-110.
- _____. 1993b. Fremont cottonwood-Goodding willow riparian forests: a review of their ecology, threats, and recovery potential. *Journal of the Arizona-Nevada Academy of Science* 27(1): 111-124.
- Swank, W. G. and J. G. Teer. 1989. Status of the jaguar-1987. *Oryx* 23: 14-21.
- Tetra Tech, Inc. 2003. Draft TEP Sahuarita - Nogales transmission line Environmental Impact Statement.
- Thiel, R. P. 1985. The relationship between road densities and wolf habitat suitability in Wisconsin. *American Midland Naturalist* 113(2): 404-407.
- Thomas, P. A. 1991. Response of Succulents to Fire: A Review. *International Journal of Wildland Fire* 1(1): 11 – 22.
- Tibbitts, T. J. 1991. Thick-billed kingbird (*Tyrannus crassirostris*). *Wildlife Views*, Arizona Game and Fish Department. Page 17.

- Unitt, P. 1987. *Empidonax traillii extimus*: An endangered subspecies. Western Birds 18: 137-162.
- URS. 2003. Tucson Electric Power Sahuarita-Nogales transmission line project - roads analysis.
- U. S. Census Bureau. 2000. Arizona state and county facts, deprived from population estimates, 2000 census of population and housing, 1990 census of population and housing, small area income and poverty estimates, county business patterns, and 1997 census of governments.
<http://quickfacts.census.gov/qfd/states/04/04023.html>.
- U.S. Department of the Interior. 1967. Native fish and wildlife. Endangered Species. Federal Register 32(48): 4001.
- U.S. Fish and Wildlife Service (USFWS). 1982. Mexican Wolf Recovery Plan. USFWS, Albuquerque, NM. 103 pp.
- _____. 1984. Gila and Yaqui Topminnow Recovery Plan. USFWS, Albuquerque, NM.
- _____. 1986. Endangered and threatened wildlife and plants; final rule to determine the Sonora chub to be a threatened species and to determine its critical habitat. Federal Register 51: 16042-16047.
- _____. 1988. Endangered and threatened wildlife and plants; determination of endangered status for two long-nosed bats. Federal Register 53(190): 38456-38460.
- _____. 1990. Listed cats of Texas and Arizona recovery plan (with emphasis on the ocelot). U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 131 pp.
- _____. 1992. Sonora Chub Recovery Plan. USFWS Region 2 Office, Albuquerque, NM. 83 pp.
- _____. 1993a. Endangered and threatened wildlife and plants; final rule to list the Mexican spotted owl as a threatened species. Federal Register 58: 14248-14271.
- _____. 1993b. Determination of endangered status for the plant Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*). Federal Register 58 (158): 49875-49880.
- _____. 1995a. Recovery plan for the Mexican spotted owl (*Strix occidentalis lucida*) Vols. 1 & 2. USFWS New Mexico Field Office, Albuquerque, NM. 169 pp.

- _____. 1995b. Determination of critical habitat for the Mexican spotted owl; final rule. Federal Register 60: 29913-29951.
- _____. 1997a. Endangered and threatened wildlife and plants: determination of endangered status for the cactus ferruginous pygmy-owl in Arizona. Federal Register 62: 10730-10747.
- _____. 1997b. Final determination of critical habitat for the southwestern willow flycatcher. Federal Register 62 (140): 39129-39146.
- _____. 1998. Endangered and threatened wildlife and plants; revocation of critical habitat for the Mexican spotted owl, loach minnow, and spikedace. Federal Register 63: 14378-14379.
- _____. 1999a. Endangered and threatened wildlife and plants; Final Rule: designation of critical habitat for the cactus ferruginous pygmy-owl. Federal Registrar 64: 37419-37440.
- _____. 1999b. Biological Opinion for Southwest Region U.S. Forest Service Ongoing Livestock Grazing Activities on Allotments. 378 pp.
- _____. 2000a. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the Mexican spotted owl. Federal Register 65: 45336-45353.
- _____. 2000b. Recommended guidance for private landowners concerning the cactus ferruginous pygmy-owl: and the cactus ferruginous pygmy-owl survey protocol. Federal Register 65: 14999-15000.
- _____. 2001a. Endangered and threatened wildlife and plants; Final designation of critical habitat for the Mexican spotted owl. Federal Register 66: 8530-8553.
- _____. 2001b. Biological Opinion on the effects of proposed livestock grazing and management on the Montana Allotment on the Nogales Ranger District, Santa Cruz County, Arizona. 51 pp.
- _____. 2001c. Biological Opinion on the effects of the proposed construction of Madera Highlands east of Green Valley in Pima County, Arizona. 18 pp.
- _____. 2001d. Biological Opinion on the effects of the scour protection project on I-19 and Frontage Road bridges over Peck Canyon near Santa Cruz River confluence in Santa Cruz County, Arizona. 38 pp.
- _____. 2001e. Mexican gray wolf (*Canis lupus baileyi*). Unpublished abstract, U. S. Fish and Wildlife Service, Arizona Ecological Services. 1 page.

- _____. 2002a. Biological Opinion on the effects of the Thornydale Road improvement project in Pima County, AZ. 66 pp.
- _____. 2002b. Biological Opinion on the effects of the proposed Pueblo Oasis Development in Pima County, AZ. 60 pp.
- _____. 2002c. Endangered and threatened wildlife and plants; Listing of the Chiricahua leopard frog (*Rana chiricahuensis*); Final Rule. Federal Register 67: 40790-40811.
- _____. 2002d. Biological Opinion on the effects of the proposed issuance of a NPDES permit for ASARCO's Mission Mine Complex in Pima County, AZ. 15 pp.
- U.S. Forest Service. 1999. Memo 2670 of July 21, 1999, from Eleanor Towns, Regional Forester, to Forest Supervisors and Staff Directors re: Sensitive species list revision. USDA Forest Service, Southwestern Region, Albuquerque, NM.
- _____. 2000. Survey Report on presence/absence of Sonora chub in California Gulch, Santa Cruz County, Arizona during July-October, 2000.
- _____. 2002. Scoping Report: noxious weed and invasive exotic plant management program. Coronado National Forest, Pima County, Arizona. 29 pp.
- U.S. Geological Survey (USGS). 2003. Northern Prairie Wildlife Research Center. North Dakota's federally listed endangered, threatened, and candidate species – 1995: Western burrowing owl (*Athene cunicularia hypugea*). <http://www.npwrc.usgs.gov/resource/distr/others/nddanger/species/athecuni.htm>. 28 March 2003.
- Ward, J. P. and W. E. Block. 1995. Mexican spotted owl prey ecology. Chapter 5 in Recovery plan for the Mexican spotted owl: Vol. II. U.S. Fish and Wildl. Serv., Albuquerque, NM.
- _____, A. B. Franklin, S. E. Rinkevich, and F. Clemente. 1995. Distribution and abundance of Mexican spotted owls. Chapter 1 in Recovery plan for the Mexican spotted owl: Vol. II. U.S. Fish and Wildl. Serv., Albuquerque, NM.
- Webb, R. G. and R. H. Baker. 1984. Terrestrial vertebrates of the Cerro Mohinora region, Chihuahua, Mexico. Southwestern Naturalist 29: 243-246.
- Weedman, D. A. and K. L. Young. 1997. Status of the Gila topminnow and desert pupfish in Arizona. Arizona Game and Fish Department, Phoenix, AZ.
- White, G. C., A. B. Franklin, and J. P. Ward. 1995. Population biology. Chapter 2 in Recovery plan for the Mexican spotted owl: Vol. II. U.S. Fish and Wildl. Serv., Albuquerque, NM.

- Wilcox, R., W. S. Richardson, and D. Abbate. 2000. Habitat selection by cactus ferruginous pygmy-owls in southern Arizona: Preliminary results. Arizona Game and Fish Department, Phoenix, AZ. 43 pp.
- Wood, T. 1991. Results of 1991 amphibian monitoring of the Coronado National Forest. Report to the Coronado National Forest and the Nature Conservancy, Tucson, AZ.

7.0 LIST OF ACRONYMS

ACC	Arizona Corporation Commission
ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
AOU	American Ornithologists' Union
ASLD	Arizona State Land Department
AUM	Animal Unit per Month
BA	Biological Assessment
BLM	Bureau of Land Management
BMP	Best Management Practices
BO	Biological Opinion
CFPO	Cactus Ferruginous Pygmy Owl
Citizens	Citizens Communications
CLF	Chiricahua Leopard Frog
CNF	Coronado National Forest
DBH	Diameter Breast Height
DOE	Department of Energy
EMA	Ecosystem Management Area
ESA	Endangered Species Act
GPS	Global Positioning System
HDMS	Heritage Data Management System
HEG	Harris Environmental Group, Inc.
I-19	Interstate 19
LLNB	Lesser Long-nosed Bat
MOA	Memorandum of Agreement
MSO	Mexican Spotted Owl
NPDES	National Pollutant Discharge Elimination System
OHV	Off-Highway Vehicle
PAC	Protected Activity Center

PPC	Pima Pineapple Cactus
RNA	Research Natural Area
ROW	Right-of-way
RD	Ranger District
RU	Recovery Units
SL	Standard Length
SWFL	Southwestern Willow Flycatcher
TEP	Tucson Electric Power
USDOI	United States Department of Interior
USFWS	United States Fish and Wildlife Service
USFS	United States Department of Agriculture Forest Service
YOY	Young-of-the-year

APPENDIX A

Natural Resource Agencies Correspondence.

1. U.S. Fish and Wildlife Service, dated 14 May 2002.
2. Arizona Game and Fish Department, dated 25 April 2002.

APPENDIX B

**Plants documented along proposed ROW of the TEP Citizens Interconnect Project,
July to October 2002.**

	SCIENTIFIC NAME	COMMON NAME	FAMILY
CACTUS & SUCCULENTS			
	<i>Agave parryi</i>	century plant	Agavaceae
	<i>Agave schottii</i>	shindagger	Agavaceae
	<i>Coryphantha scheeri</i> var. <i>robustispina</i>	Pima pineapple cactus	Cactaceae
	<i>Dasyliion wheeleri</i>	sotol	Agavaceae
	<i>Echinocereus</i> spp.	hedgehog cactus	Cactaceae
	<i>Echinocereus pectinatus</i> var. <i>rigidissimus</i>	Arizona rainbow cactus	Cactaceae
	<i>Ferocactus wislizenii</i>	fishhook barrel cactus	Cactaceae
	<i>Fouquieria splendens</i>	ocotillo	Fouquieriaceae
	<i>Mammillaria</i> spp.	pincushion cactus	Cactaceae
	<i>Nolina microcarpa</i>	beargrass	Agavaceae
	<i>Opuntia</i> spp.	cholla	Cactaceae
	<i>Opuntia</i> spp.	prickly pear	Cactaceae
	<i>Opuntia spinosior</i>	walkingstick cactus	Cactaceae
	<i>Yucca elata</i>	soaptree yucca	Agavaceae
GRASSES			
	<i>Bouteloua barbata</i> or <i>B. rothrockii</i>	six-weeks or Rothrock grama	Poaceae
	<i>Bothriochloa barbinodis</i>	cane beard grass	Poaceae
	<i>Bouteloua curtipendula</i>	side oats grama	Poaceae
	<i>Bouteloua gracilis</i>	blue grama	Poaceae
	<i>Bouteloua hirsuta</i>	hairy grama	Poaceae
	<i>Bouteloua parryi</i>	Parry grama	Poaceae
	<i>Bouteloua repens</i>	slender grama	Poaceae
	<i>Digitaria californica</i>	Arizona cottontop	Poaceae
	<i>Erioneuron pulchellum</i>	fluffgrass	Poaceae
	<i>Hilaria belangeri</i>	curly mesquite	Poaceae
	<i>Leptochloa dubia</i>	green sprangletop	Poaceae
	<i>Muhlenbergia emersleyi</i>	bull grass	Poaceae
	<i>Muhlenbergia rigens</i>	deer grass	Poaceae
	<i>Piptochaetium fimbriatum</i>	pinyon rice grass	Poaceae
	<i>Sporobolus</i> spp.	dropseed	Poaceae
FORBS			
	<i>Abutilon incanum</i>	Indian mallow	Malvaceae
	<i>Allionia incarnata</i>	trailing windmills	Nyctaginaceae
	<i>Ambrosia confertiflora</i>	weakleaf burr ragweed	Asteraceae
	<i>Amoreuxia palmatiflida</i>	Arizona yellow show	Cochlospermaceae
	<i>Argemone</i> sp.	prickly poppy	Papaveraceae
	<i>Artemisia ludoviciana</i>		Asteraceae
	<i>Asclepias asperula</i>	antelope horns	Asclepiadaceae
	<i>Asclepias nummularia</i>	tufted milkweed	Asclepiadaceae
	<i>Asclepias tuberosa</i>	butterfly milkweed	Asclepiadaceae
	<i>Aspicarpa hirtella</i>	aspicarpa	Malpighiaceae
	<i>Boerhaavia coccinea</i>	red spiderling	Nyctaginaceae
	<i>Bouchea prismatica</i>	bouchea	Verbenaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY
FORBS (Cont.)			
	<i>Bouvardia glaberrima</i>	smooth bouvardia	Rubiaceae
	<i>Brickellia</i> spp.	brickellbush	Asteraceae
	<i>Chamaecrista serpens</i> var. <i>wrightii</i>	sensitive pea	Fabaceae
	<i>Cheilanthes fendleri</i>	cloak fern	Pteridaceae
	<i>Cheilanthes</i> spp.	cloak fern	Pteridaceae
	<i>Chenopodium fremontii</i>	lamb's quarter	Chenopodiaceae
	<i>Clitoria mariana</i>	butterfly pea	Fabaceae
	<i>Cnidosculus angustidens</i>	mala mujer	Euphorbiaceae
	<i>Cologania longifolia</i>	narrowleaf tick clover	Fabaceae
	<i>Commelina dianthifolia</i>	western dayflower	Commelinaceae
	<i>Cucurbita digitata</i>	coyote gourd	Cucurbitaceae
	<i>Datura meteloides</i>	sacred datura	Solanaceae
	<i>Eleocharis</i> spp.	spikerush	Cyperaceae
	<i>Eriogonum wrightii</i>	buckwheat	Polygonaceae
	<i>Eryngium heterophylla</i>	button snakeroot	Apiaceae
	<i>Evolvulus alsinoides</i>		Convolvulaceae
	<i>Evolvulus arizonicus</i>	Arizona blue eyes	Convolvulaceae
	<i>Galium wrightii</i>	northern bedstraw	Rubiaceae
	<i>Glandularia gooddingii</i>	verbena	Verbenaceae
	<i>Gnaphalium leucocephalum</i>	white cudweed	Asteraceae
	<i>Gnaphalium wrightii</i>	cudweed	Asteraceae
	<i>Gomphrena</i> sp.	globe amaranth	Amarnathaceae
	<i>Gutierrezia</i> spp.	snakeweed	Asteraceae
	<i>Ipomoea barbatisepala</i>	morning glory	Convolvulaceae
	<i>Ipomoea coccinea</i>	scarlet creeper	Convolvulaceae
	<i>Ipomoea hirsutula</i>	wooly morning glory	Convolvulaceae
	<i>Ipomoea leptotoma</i>	bird's foot morning glory	Convolvulaceae
	<i>Ipomoea longifolia</i>	long leaf morning glory	Convolvulaceae
	<i>Isocoma tenuisecta</i>	burroweed	Asteraceae
	<i>Jatropha macrorhiza</i>	Arizona desert potato	Euphorbiaceae
	<i>Kallstroemia grandiflora</i>	Arizona caltrop	Zygophyllaceae
	<i>Krameria parvifolia</i>	range ratany	Krameriaceae
	<i>Machaeranthera</i> spp.	spiny aster	Asteraceae
	<i>Macroptilium gibbosifolium</i>	variableleaf bushbean	Fabaceae
	<i>Milla biflora</i>	Mexican star	Liliaceae
	<i>Oenothera rosea</i>	evening primrose	Onagraceae
	<i>Oxalis albicans</i>	wild oxalis	Oxalidaceae
	<i>Penstemon linarioides</i>	linear leaf penstemmon	Scrophulariaceae
	<i>Phaseolus ritensis</i>	eggleaf stringbean	Fabaceae
	<i>Phaseolus</i> sp.	stringbean	Fabaceae
	<i>Portulaca suffrutescens</i>	portulaca	Portulacaceae
	<i>Portulaca umbraticola</i>	portulaca	Portulacaceae
	<i>Proboscidea</i> sp.	unicorn plant, devil's claw	Pedaliaceae
	<i>Salvia subincisa</i>	sawtooth sage	Lamiaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY
FORBS (Cont.)			
	<i>Schoenocrambe linearifolia</i>	schoenocrambe	Brassicaceae
	<i>Scirpus</i> sp.	bulrush	Cyperaceae
	<i>Senna covesii</i>	desert senna	Fabaceae
	<i>Senna hirsuta</i>	woolly senna	Fabaceae
	<i>Solanum douglassii</i>	greenspot nightshade	Solanaceae
	<i>Solanum elaeagnifolium</i>	silverleaf nightshade	Solanaceae
	<i>Sphaeralcea</i> spp.	globe mallow	Malvaceae
	<i>Tagetes</i> sp.	marigold	Asteraceae
	<i>Talinum angustissimum</i>	talinum	Portulacaceae
	<i>Talinum aurantiacum</i>	orange fameflower	Portulacaceae
	<i>Tetramerium hispidum</i>	tetramerium	Acanthaceae
	<i>Thalictrum fendleri</i>	Fendler's meadow rue	Ranunculaceae
	<i>Vitis arizonica</i>	Arizona grape	Vitaceae
	<i>Zinnia acerosa</i>	desert zinnia	Asteraceae
TREES & SHRUBS			
	<i>Acacia angustissima</i>	white ball acacia	Fabaceae
	<i>Acacia constricta</i>	whitethorn acacia	Fabaceae
	<i>Acacia greggii</i>	catclaw acacia	Fabaceae
	<i>Aloysia wrightii</i>	oreganillo	Verbenaceae
	<i>Arctostaphylos</i> sp.	manzanita	Ericaceae
	<i>Baccharis salicifolia</i>	seep willow	Asteraceae
	<i>Baccharis sarothroides</i>	desert broom	Asteraceae
	<i>Calliandra eriophylla</i>	fairyduster	Fabaceae
	<i>Celtis pallida</i>	desert hackberry	Ulmaceae
	<i>Celtis reticulata</i>	netleaf hackberry	Ulmaceae
	<i>Chrysothamnus teretifolius</i>	green rabbitbrush	Asteraceae
	<i>Dodonaea viscosa</i>	hopbush	Sapindaceae
	<i>Ericameria laricifolia</i>	turpentine bush	Asteraceae
	<i>Erythrina flabelliformis</i>	coral bean	Fabaceae
	<i>Eysenhardtia orthocarpa</i>	kidney wood	Fabaceae
	<i>Fraxinus velutina</i>	velvet ash; Arizona ash	Oleaceae
	<i>Gossypium thurberi</i>	desert cotton	Malvaceae
	<i>Guardiola platyphylla</i>	Apache plant	Asteraceae
	<i>Hibiscus coulteri</i>	desert rosemallow	Malvaceae
	<i>Indigofera spaerocarpa</i>	Sonoran Indigo	Fabaceae
	<i>Juglans major</i>	Arizona walnut	Juglandaceae
	<i>Juniperus deppeana</i>	alligator juniper	Cupressaceae
	<i>Lasianthaea podocephala</i>	San Pedro daisy	Asteraceae
	<i>Lycium</i> spp.	wolfberry	Solanaceae
	<i>Mimosa biuncifera</i>	catclaw mimosa	Fabaceae
	<i>Mimosa dysocarpa</i>	velvet pod mimosa	Fabaceae

	SCIENTIFIC NAME	COMMON NAME	FAMILY
TREES & SHRUBS (Cont.)			
	<i>Parkinsonia microphylla</i>	yellow paloverde	Fabaceae
	<i>Populus fremontii</i>	Fremont cottonwood	Salicaceae
	<i>Prosopis velutina</i>	velvet mesquite	Fabaceae
	<i>Q. arizonica</i>	Arizona white oak	Fagaceae
	<i>Q. garrya</i>	silktassel	Fagaceae
	<i>Quercus emoryii</i>	Emory oak	Fagaceae
	<i>Rhus aromatica</i>	skunkbush	Anacardiaceae
	<i>Rhus choriophylla</i>	sumac	Anacardiaceae
	<i>Salix exigua</i>	coyote willow	Salicaceae
	<i>Tamarix pentandra</i>	salt cedar	Tamaricaceae
	<i>Ziziphus obtusifolia</i>	graythorn	Rhamnaceae

APPENDIX C

TEP-Citizen's Interconnect Project

Environmental Training Guidelines for Construction Supervisors

- Stay in the designated work areas. Approved work areas, access roads, and staging areas will be clearly marked. All project activities must remain in these areas. Do not work or trespass beyond the signed or fenced restricted work areas.
- Restrict vehicle access to public roadways and designated access roads. Cross-country driving is prohibited.
- No driving or parking within 100 feet of ponds and tanks.
- Do not transfer water from one pond or tank to another or between any other bodies of water.
- No in-stream activity or disposal of construction debris or fill is allowed.
- Store topsoil and trench spoils behind sediment control structures at least 20 feet from any stream bank, including dry washes.
- Check equipment for leaks or heavy surface oil build-up before working in streams or washes.
- The use or transfer of hazardous materials will not be allowed within 100 feet of any stream or wash is prohibited.
- Do not litter. Dispose of trash in designated containers. Uncontained trash can attract wildlife and unwanted pests. Cigarette butts are considered litter, and should be extinguished and disposed of appropriately. All litter and construction debris must be removed from the job site daily.
- No pets or firearms. They are prohibited for job-site protection and protection of wildlife.
- Hunting is prohibited.
- Clearing will be limited to the minimum required to provide a safe construction area. Make sure you know the clearing limit, and if possible, leave plant root systems in place when clearing vegetation.
- It is illegal to harm, harass, pursue, hunt, shoot, wound, trap, kill capture, or collect wildlife officially listed as threatened or endangered. Violation of threatened and endangered special laws can result in penalties of up to \$100,000 and/or 1 year in jail.
- Do not approach or feed wildlife. Keep away from their burrows and nests. Do not harm or kill any wildlife encountered.
- If animal is harmed or found harmed, contact your Construction Supervisor or the Environmental Inspector. Do not attempt to move the animal yourself.

APPENDIX D

APPENDIX D. Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima and Santa Cruz Counties, Arizona as of 18 November 2003, excluded from further consideration.

COMMON NAME	SCIENTIFIC NAME	STATUS	HABITAT	JUSTIFICATION
PLANTS				
Canelo Hills ladies' tresses	<i>Spiranthes delitescens</i>	Endangered	Finely grained, highly organic, saturated soils of cienegas. Potential habitat occurs in Sonora, Mexico, but no populations have been found.	No habitat present.
Huachuca water umbel	<i>Lilaeopsis schaffneriana</i> ssp. <i>recurva</i>	Endangered	An emergent aquatic plant that requires marshy wetlands.	No habitat present.
Kearney's blue star	<i>Amsonia kearneyana</i>	Endangered	Known only from the Baboquivari Mountains.	ROW is outside of known range.
Nichol's Turk's head cactus	<i>Echinocactus horzonthalonius</i> var. <i>nicholii</i>	Endangered	Dependent on limestone substrates in desert hills.	No habitat present.
FISH				
Desert pupfish	<i>Cyprinodon macularius</i>	Endangered	Shallow springs, small streams, and marshes. Tolerates saline and warm water.	No habitat present in area.
Gila chub	<i>Gila intermedia</i>	Proposed Endangered	Small streams and cienegas; prefer deeper pools with cover.	No habitat present in area.
Loach minnow	<i>Tiaroga cobitis</i>	Threatened	Requires perennial streams with swift water over cobble or gravel	No habitat present in area.
Spikedace	<i>Meda fulgida</i>	Threatened	Requires perennial streams with swift velocities over sand and gravel.	No habitat present in area.
AMPHIBIANS				
Sonoran tiger salamander	<i>Ambystoma tigrinum stebbinsi</i>	Endangered	Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains at 4,000-6,300 ft.	ROW is outside of known range. This species is not known to occur in the Nogales RD.

APPENDIX D (cont.). Federally Listed, Proposed, and Candidate Species under jurisdiction of the U.S. Fish and Wildlife Service in Pima and Santa Cruz Counties, Arizona as of 18 November 2003, excluded from further consideration.

BIRDS

Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey.	Winter surveys of Peña Blanca and Arivaca lakes were conducted in 1994, 1995, 1996, 1998, 2000, 2001, and 2002. No bald eagles have been observed.
California brown pelican	<i>Pelecanus occidentalis californicus</i>	Endangered	Coastal land and islands; species is found around many Arizona lakes and rivers.	No habitat present in area.
Masked bobwhite	<i>Colinus virginianus ridgewayi</i>	Endangered	Only known Arizona population has been reintroduced on Buenos Aires Natl. Wildl. Refuge	ROW is outside of known range.
Mountain plover	<i>Charadrius montanus</i>	Proposed Threatened	Open arid plains, short grass prairies, and cultivated farms.	No habitat present in area.
Northern apolomado falcon	<i>Falco femoralis septentrionalis</i>	Endangered	Grassland and savannah habitats.	No recent confirmed reports for Arizona.

MAMMALS

Ocelot	<i>Felis pardalis</i>	Endangered	Prefers humid tropical & sub-tropical habitats; typically found at higher elevations.	ROW is outside of known range.
Jaguarundi	<i>Felis yagouaroundi tolteca</i>	Endangered	Deciduous forests, riparian areas, swampy grasslands, upland dry savannahs, etc.	ROW is outside of known range.
Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>	Endangered	Grassy desertscrub in northwestern Sonora and adjacent Arizona borderlands, mainly Yuma Co.	ROW is outside of known range.

STATUS DEFINITIONS: ENDANGERED SPECIES ACT

Endangered: Imminent jeopardy of extinction.

Threatened: Imminent jeopardy of becoming endangered.

Proposed: Proposed Rule has been published in Federal Register to list as Threatened or Endangered.